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THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR JULY 1859.

ART. I.—*Experimental Researches relative to Corroval and Vao—Two New Varieties of Woorara, the South American Arrow Poison.* By WILLIAM A. HAMMOND, M. D., Assistant Surgeon U. S. Army, and S. WEIR MITCHELL, M. D., Lecturer on Physiology in the Philadelphia Medical Association. (Read before the Academy of Natural Sciences, Biological Department, May 16, 1859. Recommended for publication May 31, 1859.) With three wood-cuts.

THE history of the remarkable poison which we design to consider in the present memoir, has been so well detailed by M. Cl. Bernard,[1] that it would be useless for us to enter fully into this portion of the subject. We shall, accordingly, confine ourselves more particularly to an examination of those accounts which relate to the discovery and mode of preparation of the substance in question, and to the indication of a few statements which have escaped M. Bernard's attention.

Woorara was first introduced to the civilized world in 1595, by Sir Walter Raleigh,[2] on his return from Guiana. The following quotation describes graphically, but with much exaggeration, the action of the poison.

"There was nothing whereof I was more curious, than to finde out the true remedies of these poisonous arrowes; for besides the mortalitie of the wound they make, the partie shot indureth the most insufferable torment in the world, and abideth a most uglie and lamentable death, sometimes dying starke mad, sometimes their bowels breaking out of their bellies, and are presently discoloured as blacke as pitch, and so unsavoury as no man can endure to cure or attend them, and it is more strange to know that in all this time there was never Spaniard, either by gift or torment, that could attaine to the true

[1] Leçons sur les Effets des Substances Toxiques, &c., 1857, p. 238.

[2] Raleigh's Discoverie of Guiana. Printed for the Hakluyt Society. London, 1848.

knowledge of the cure, although they have martyred and put to invented torture I know not how many of them. But every one of these Indians know it not, no, not one among thousands, but their soothsaiers and priests who do conceale it and only teache it but from the father to the sonne."

Garcilasso de la Vega[1] states that the Indians of Peru poisoned their arrows with a species of herb, and that symptoms of poisoning were not produced till about three days after the wound was given; death followed in seven days afterwards, the sufferer raving, eating or gnawing his own flesh, and beating his brains against the wall.

Another kind of poison is spoken of by De la Vega, in which the decomposing matters of human flesh form an important constituent. Previous to the arrival of the Spaniards, the flesh of the natives was employed for this purpose, but conceiving the idea that the flesh of a red-headed Spaniard possessed more heat and virulency than that of their own people, they subsequently employed this material whenever it fell in their way.

De la Condamine[2] states that the poison used by the Indians of South America is extracted by means of heat from the juice of several plants, and especially from certain *lianes* [in Spanish, bejucos, in English, bindweeds]. He asserts that there are over thirty kinds of plants in the Ticunas poison.

Bancroft[3] is more explicit, and gives the following formula for the woorara :—

Bark of the root of the wooraro, six parts;
Bark of the warracobba corra, two parts;
Barks of the root of coranapi baketi, and of hatchybaly, of each one part.

"All these are to be finely scraped and put into an Indian pot and covered with water. The pot is then to be placed over a slow fire that the water may simmer for a quarter of an hour. After which the fluid is to be expressed from the bark by the hands, taking care that the skin is unbroken; this being done, the bark is to be thrown away and the juice evaporated over a moderate fire to the consistence of tar, when it is to be removed.

"The smallest quantity of this poison conveyed by a wound into the red bloodvessels of an animal, causes it to expire in less than a minute, without much apparent pain or uneasiness, though slight convulsions are sometimes seen near the instant of expiration."

According to Fermin,[4] the Indians of Surinam poison their arrows by dipping them to the height of two inches in the juice of a tree called *mancelinier*.

"As soon as an incision is made in this tree, a milky and acrid substance flows out, filled with particles so volatile that the poison is as prompt as violent. It remains active for a long time after the arrows are dipped into it, as I have myself proved in several instances, by shooting animals with arrows which had been poisoned four or five years previously. Death ensued in half an hour after the wounds were inflicted. I have these arrows still in my possession, and

[1] History of Peru. Chapter 37, p. 741.
[2] Relation abrégé d'un Voyage fait dans l'Intérieur de l'Amérique Méridionale, etc. Mémoires de l'Académie des Sciences, t. xii., 1745, p. 391.
[3] Essay on the Natural History of Guiana. London, 1769, p. 288.
[4] Description Générale Historique, Géographique et Physique de la Colonie de Surinam. Amsterdam, 1769, p. 52.

have no doubt that the poison is as active as ever. To show how pernicious it is when recent, the following experiment is adduced:—

"In order to convince the Spaniards, an Indian king wounded a child twelve years of age, slightly in one of the toes, with a poisoned arrow, and immediately ordered the surgeons whom he had summoned, to amputate the limb. This was scarcely done when the Spaniards saw the child expire, not in consequence of the operation, as was fully verified, but from the effects of the poison which was suddenly thrown into the mass of the blood, and had rapidly reached the most important organs, before relief could be afforded."

Humboldt[1] gives a full account of the woorara, and denies many of the absurd statements of previous writers. He was present during the manufacture of the poison at Esmeralda, and states that it is derived from the bark and alburnum of the bejuco de mavacure, a species of bind-weed, belonging to the strychnos family. The fresh juice of this plant is not regarded as poisonous, probably, as Humboldt states, on account of its not being in a concentrated condition. The manner of preparing the poison is as follows:—

"A cold infusion is first prepared by pouring water on the fibrous matter which is the ground bark of the *mavacoure*. A yellowish water filters during several hours, drop by drop, through the leafy funnel. This filtered water is the venomous liquor, but it acquires strength only when it is concentrated by evaporation, like molasses, in a large earthen pot. The Indian from time to time invited us to taste the liquid; its taste, more or less bitter, decides when the concentration by fire has been carried sufficiently far. There is no danger in this operation, the *curare* being deleterious only when it comes into immediate contact with the blood. The vapours, therefore, which are disengaged from the pans are not hurtful, notwithstanding what has been asserted on this point by the missionaries of the Orinoco."

In order to give body to the extract, another vegetable juice of a very glutinous character is added. The mass thus formed constitutes the curare of commerce.

Another species of the poison prepared entirely from the root is less active.

According to Waterton,[2] the woorara is prepared by the Macousi Indians in the following manner.

The materials required are the woorali vine, a bitter root, one or two bulbous plants, two species of poisonous ants, some strong Indian pepper, and the fangs of the labarri and corra-couchi snakes. Having procured these materials, the Macousi proceeds as follows:—

"He scrapes the woorali vine and bitter root into thin shavings, and puts them into a kind of colander made of leaves; this he holds over an earthen pot and pours water on the shavings; the liquor which comes through has the appearance of coffee. When a sufficient quantity has been procured, the shavings are thrown aside. He then bruises the bulbous stalks and squeezes a proportionate quantity of their juice through his hands into the pot. Lastly, the snakes' fangs, ants, and pepper are bruised and thrown into it. It is placed then on a slow fire, and as it boils more of the juice of the woorali is added ac-

[1] Personal Narrative of Travels to the Equatorial Regions of the New Continent during the years 1799–1804. 2d edition. London, 1827, vol. v. p. 519.

[2] Wanderings in South America, p. 51.

cording as it may be found necessary, and the scum is taken off with a leaf; it remains on the fire till it is reduced to a thick syrup of a dark brown colour. As soon as it has arrived at this state, a few arrows are poisoned with it to try its strength."

Schomburgk[1] asserts with much confidence that the woorara is prepared entirely from vegetable substances, the chief of which is the bark of the *strychnos toxifera*. According to this author, the following experiment was instituted by his brother: A gallon of water was added to two pounds of the bark of the *strychnos toxifera*, and allowed to remain for twenty-four hours. Half of the fluid, which was already of a brown colour, was then put into another vessel and evaporated over a slow fire to a syrupy consistence, the remaining half of the fluid being added as evaporation progressed. Two chickens were then wounded with instruments charged with the extract, one in the foot, the other in the neck. Symptoms of poisoning were evident in five minutes. The first died in twenty-seven minutes, the other in twenty-eight minutes after the infliction of the wounds. It is thus shown that the extract of the bark of the *strychnos toxifera* alone, when introduced into the circulation, is speedily fatal.

Schomburgk moreover had an opportunity, as he states, of witnessing the preparation of the woorara by an Indian. According to the account which he gives, three species of the *strychnos* enter into its composition, besides six other plants. No animal matter of any kind was used in its manufacture.

According to Osculati,[2] the poison prepared by the Indians of the province of Esmeralda, and which is called *ciguela* is extracted from a tree, and is not to be compared in virulence with the ticunas. The ciguela will kill a small animal in about ten minutes, but is not fatal when introduced into the human system, causing only pustules and malignant ulcerations. He also refers to another arrow poison prepared by the Colorados.

Osculati[3] also states that the Orekones and Ticunas are celebrated for the manufacture of certain active poisons which kill in two or three minutes. These poisons vary very much in composition among the several tribes. The *ticunas*, or *huarare*, mixed with the *lamas*, a poison prepared by the Lamas Indians, forms a toxic compound fatal to all animals. The ticunas alone is not fatal to quadrupeds or birds. The lamas is considered to be more active, but even this is not fatal to quadrupeds. In a note it is stated that having sent a few small fragments of the poison to Prof. Luigi Patellini, experiments were instituted with it by this gentleman. A guinea pig, poisoned with it, died in about five minutes in tetanic convulsions. The temperature of the body fell at once.

Dalton[4] repeats Waterton's account of the method of manufacturing the

[1] Reisen in Britisch Guiana. Leipzig, 1847. Band i., s. 445 et seq.
[2] Esplorazione delle Regione Equatoriale. Milano, 1850. p. 108.
[3] Op. cit., p. 207.
[4] History of British Guiana. London, 1855. Vol. i. p. 68.

woorara, and adds little if any additional information on the subject. He also states, after Hartsinck, that the Indians test the virulence of the poison by shooting arrows charged with it into trees. If the leaves drop off or wither within three days it is deemed sufficiently powerful.

It is highly probable, as Tschudi[1] asserts, that the poison used for weapons by the South American Indians varies with every tribe. This traveller declares that, notwithstanding all assertions to the contrary, animal poisons do enter into the composition of the arrow-poison used by the Indians of Peru. His evidence, however, is only of a hearsay character, as he never witnessed the preparation.

Herndon[2] who, however, does not seem to have paid particular attention to this point, but whose evidence, as far as it goes, is in every way reliable, asserts that the arrow-poison used by the Indians of the Amazon is of a vegetable character, and prepared from the juice of a creeper called *bejuco de ambihuasca* mixed with *aji* or strong red pepper, *barbasco, sarnango,* and any other poisonous substances known to the Indians.

Taking the accounts of the several authors we have quoted, as well as the evidence of others who have written on the subject, into consideration, we cannot avoid coming to the conclusion that a great deal of uncertainty still exists relative to the substances and method used in the preparation of the woorara. The earlier accounts on this point are so distorted with manifestly erroneous ideas, and so exaggerated in their detail, that we can place but little reliance upon them. Among later writers, Schomburgk is perhaps more to be depended upon than any other, both on account of general accuracy and high scientific attainments, but it is almost certain that every tribe has its own distinct poison, differing more or less from that of every other tribe. The evidences we have to submit on this point, from our own researches, will, we think, abundantly establish the fact of the different physiological effects resulting from poisoning in the different specimens of woorara, and consequently clearly indicate a difference in composition.

Physical and Chemical Properties.—The woorara obtained by Bancroft[3] is stated by him to have possessed the following properties: It was liquefiable by heat, and dissolvable in water, alcohol, hydrochloric acid and liquor ammoniæ, as also in blood, saliva, &c., except a very small part which subsided both in a spirituous and aqueous menstruum, and consisting, as he thinks, of earthy particles foreign to the composition. It united with acids without emotion or change of colour. On mixing it with alkalies, no ebullition was perceptible, but the colour changed from a reddish brown to a yellowish brown. A few grains mixed with as many

[1] Travels in Peru. English edition. London, 1847, p. 407.
[2] Exploration of the Valley of the Amazon. By Lieut. W. Lewis Herndon, U. S. Navy. Washington, 1853, p. 140.
[3] Op. cit., p. 291.

ounces of human blood, entirely prevented a separation of serum and crassamentum, and the whole mass continued in a state of fluidity.

The first reliable and thorough examination made of the woorara, and one which even yet has not been excelled in completeness, was that of MM. Roulin and Boussingault.[1] The specimen examined by these chemists was obtained from the Rio Negro. It was a solid extract, black, of a resinous appearance, of a brown colour when reduced to powder, and of an intensely bitter taste. This bitterness was unaccompanied by acridity or sharpness. It burned with difficulty, and in consuming gave off no odour of organic nitrogenous substances.

It was but slightly soluble in sulphuric ether, more so in alcohol, forming a beautiful red and very bitter tincture. In water it was soluble to a considerable extent, forming an intensely bitter infusion, of slight acid reaction to litmus paper.

By further investigation, MM. Roulin and Boussingault arrived at the conclusion that no strychnia was present. They, however, obtained an alkaline principle soluble in water, for which the name of *curarin* has been proposed. This substance they obtained by the following procedure:—

The woorara was reduced to powder, and treated repeatedly with boiling alcohol. The alcoholic extract was evaporated, and the residue treated with water, which dissolved the active principle, leaving nothing but a little resinous matter. The aqueous solution was then decolorized by animal charcoal, and treated with infusion of galls. A beautiful whitish-yellow flaky precipitate was thrown down.

The precipitate thus obtained was well washed, heated to ebullition in water, and dissolved by the addition of oxalic acid. The acid liquor was then supersaturated by magnesia and filtered. It was again evaporated to dryness, and the residue dissolved in alcohol. This solution was concentrated and spontaneously evaporated to a syrupy consistence. It was then further concentrated by evaporation *in vacuo*.

Thus obtained, the *curarin* was a solid transparent mass, of an excessively bitter taste, and possessed in an eminent degree of all the virulence of the woorara. It was not crystallizable, was of a pale-yellow colour, and strongly attractive of moisture from the atmosphere. It formed salts with sulphuric, nitric, hydrochloric, and acetic acids, none of which were crystallizable.

MM. Roulin and Boussingault are of the opinion that the normal acid of the woorara is the acetic.

The results of the examination made by the above named chemists were subsequently confirmed by MM. Pelletier and Petroz.[2]

Heintz[3] has also examined the woorara chemically. By adding tannic acid to the aqueous solution of this substance, he obtained an abundant

[1] Examen Chimique du Curare, Poison des Indiens de l'Orinoque. Annales de Chimie et de Physique. Tome xxxix., 1828, p. 24.

[2] Examen Chimique de Curare, Annales de Chimie et de Physique, tom. xl., 1829, p. 213.

[3] Reisen in Britisch Guiana. Von Richard Schomburgk. Band i. s. 452 (note).

precipitate soluble in boiling water. This was taken from the filter, boiled with magnesia, and then evaporated to dryness. The extract thus obtained was then treated with alcohol, to remove it from any insoluble salts of magnesia, and the solution again evaporated to dryness. By this means a yellowish-brown extract was obtained, possessing no alkaline reaction, but endowed in an eminent degree with the toxic principle of the woorara. Heintz does not regard this extract as at all pure. He afterwards employed both the bichlorides of mercury and platinum to effect the precipitation, but with no better success, a yellowish-brown extract being still obtained.

By Lassaigne's method Heintz convinced himself that the extract contained nitrogen. He also found sugar, gum, resin, extractive matter, tannic and gallic acids, and traces of saline combinations with organic acids—probably the tartaric and oxalic.

He was unable to find the least trace of strychnia.

Dr. Brainard,[1] of Chicago, asserts that by an analysis, undertaken at his suggestion, formic acid and a proteinaceous substance were detected in the woorara. None of the details of the analysis are given, and we must therefore await further particulars before accepting such a statement.

Dr. Brainard,[2] in conjunction with Dr. Green, of New York, presented a communication to the French Academy of Sciences, in which the opinion is expressed that the poisonous action of the woorara is probably due to the venom of certain reptiles. Boussingault,[3] however, in the debate which followed, denied the existence of any animal matter in the woorara; and in a subsequent paper, in which the whole subject of woorara is well discussed, Dr. Green[4] doubts the existence of animal poison in the substance in question.

From our own investigations, as well as from those we have referred to, we think it highly improbable that the activity of the woorara is due to animal matters. Doubtless it is true that some Indians introduce the fangs, livers, &c., of venomous reptiles into their arrow poison, but it is scarcely possible that such substances, even if poisonous in the first instance, would retain their activity through the process of manufacture which the woorara undergoes. When we come to detail our own observations, we shall return to this point, so far as it relates to the varieties of this poison with which we have experimented.

Physiology.—The earliest recorded experiments with woorara, of a systematic character, to which we have been able to refer, are those of De la

[1] Smithsonian Report, 1854, p. 123 et seq.
[2] Comptes Rendus, tom. xxxviii., 1854, p. 411 et seq.
[3] Op. cit., p. 414.
[4] American Medical Gazette, vol. vii. No. 1 (new series), Jan., 1858, p. 2, et seq. See also vol. vi. No. 5, May, 1855, and vol. vi. No. 7, July, 1855, for Dr. Green's other important papers on this subject.

Condamine,[1] who relates that his observations were made with arrows which he had possessed for more than a year.

In presence of several high personages a chicken was slightly wounded with a small arrow charged with the poison. It died in seven minutes and a half. Another, pricked in the wing with a similar arrow, died very soon in convulsions, notwithstanding sugar, an alleged antidote, was employed. A third, similarly wounded, recovered, the antidote having been immediately administered. De la Condamine states that age and a low temperature lessen the activity of the poison.

Brocklesby[2] experimented on a cat with the woorara by inoculating the animal with it. The cat expired in about half an hour. An hour afterwards the heart was pulsating, and it continued to beat for two hours after the animal's head was cut off. He found the poison to kill a small bird the moment two drops of it, in solution, were placed on the tongue. He also performed other experiments with it, which, however, do not possess any particular interest.

Herissant[3] instituted a great many experiments on animals with the woorara. Among others is one of, at first sight, considerable importance. He placed a tight ligature around the right posterior leg of a rabbit, and inoculated the animal with the poison of lamas and ticunas below the constriction. The rabbit died in less than ten minutes. In this case it is more than probable that a portion of the poison entered the circulation.

A bear wounded with an arrow dipped into a solution of the poison died in less than five minutes.

He also states that a small boy, to whom he had assigned the task of superintending the evaporation of an aqueous solution of the poison, became sick and faint, but recovered by exposure to fresh air and the administration of a pint of wine and a quantity of sugar. He was himself similarly affected, but recovered by like treatment.

From his experiments he concludes, among many other deductions, that the animals killed with the poison of lamas and ticunas are paralyzed in almost all the muscles before death, and that the muscles are pale and totally deprived of blood.

Fontana's[4] investigations were of a much more philosophical character than those we have referred to, and have formed the basis for most of the succeeding experiments on the subject. He showed conclusively that the vapor of the poison is not deleterious when respired, and thus dissipated one of the ridiculous ideas which had been circulated relative to its action.

[1] Relation abrégé d'un Voyage fait dans l'Intérieur de l'Amérique, Méridionale, etc. Mémoires de l'Académie des Sciences, tom. lxii., 1745, p. 391 et seq.

[2] Letter to the President of the Royal Society. Philosophical Transactions, vol. xliv. part ii., 1747, p. 408.

[3] Experiments made on a great Number of living Animals with the Poison of Lamas and Ticunas. Philosophical Transactions, vol. xlvii., 1751–52, p. 75.

[4] Mémoire sur le Poison Américaine, appellée Ticunas, etc. Sur les Poisons et sur le Corps Animal. Florence, 1781. Tom. ii. p. 83 et seq.

Fontana's experiments are so admirably conceived and carried out, that we think it advisable to lay the main facts of some of them before the Department.

With reference to the action of the ticunas when taken internally, Fontana was the first, we believe, to point out the fact that the state of the stomach at the time of the administration of the poison exercises a most important influence over the result. Thus he found that when the animal's stomach contained a considerable amount of food, death did not follow; but that when this viscus was empty, the animal succumbed, though at a later period than if the substance had been inserted into a wound. Moreover, a larger quantity was required.

He also determined the inefficacy of acids and alkalies as antidotes to the action of the ticunas.

With reference to its effect upon the blood, Fontana found that coagulation was absolutely prevented when a solution of the poison was mixed with it, but that the red corpuscles were not at all modified either in form or size.

He next investigated the action of the ticunas when applied to a nerve entirely isolated from the surrounding tissues. After many careful experiments, he arrived at the conclusion that under such a condition no poisoning is produced.

From additional observations he finally concludes that the ticunas destroys the irritability of the voluntary muscles, but does not affect that of the heart.

We next come to Brodie's[1] researches, which were instituted with woorara brought from Guiana by Bancroft. It was found that after apparent death the heart continued to pulsate for some time, and that its action might be still further prolonged by means of artificial respiration. It was also further ascertained that after division of the nerves supplying the inoculated limb, or ligature of the thoracic duct, the effects of the poison were still produced if the circulation of the blood was not impeded; and hence it was concluded that it is only through this latter channel that the substance in question is capable of exercising its influence. Finally, it was determined that woorara affects the brain by passing into the circulation and acting directly upon the cerebral substance.

In a continuation of the paper quoted, Brodie[2] details the results of further experiments relative to the effects of artificial respiration on animals apparently dead from poisoning with woorara. In one case the animal was perfectly restored to life through the means referred to, notwithstanding the function of the brain had been entirely suspended for a long time.

[1] Experiments and Observations on the different Modes in which Death is produced by certain Vegetable Poisons. Philosophical Transactions, part i., 1811, p. 178 et seq.

[2] Further Experiments and Observations on the Action of Poisons on the Animal System. Philosophical Transactions, part i., 1812, p. 205 et seq.

Waterton[1] also has shown that by means of artificial respiration life may be preserved in animals poisoned with woorara.

Passing over a number of other observations on this subject to which we might refer, we come next to experiments of a later date, performed under more enlightened physiological views, and consequently with more definiteness of purpose. We shall present the main results of these in due order.

Virchow and Münter[2] are the first to whom we have to refer under this head. Numerous experiments were performed by these observers, from which they deduce the following conclusions:—

1. That the woorara, even after having been kept dry for five years, is still intensely poisonous.
2. That the physiological action of the woorara is in harmony with the chemical analysis which denies the presence of strychnia.
3. That woorara therefore does not belong to the class of tetanic poisons, but, like opium, induces stupor; and although it causes slight convulsive actions in cats, there is, nevertheless, neither tetanus nor trismus.
4. That it induces paralysis of the voluntary muscles, with, at the same time, long-continued action of the involuntary muscles (heart, intestines).
5. That woorara does not appear to produce death by absorption from the external surface of the body, but only when it is absorbed through a solution in the continuity of the animal tissues.
6. That in poisoning by woorara, coagulation of the fibrin of the blood ensues in the same manner as though the animal is killed by mechanical means; and that death takes place not so much from any direct result of the poison, but indirectly by its causing the cessation of the respiratory process.

Next in order of publication are the experiments of Bernard and Pelouze.[3] After detailing to some extent the history and physical and chemical properties of the woorara, it is stated that animals poisoned with this substance die without tetanic spasm, there being only a few slight contractions of the muscles of the skin, face, and body.

On examining the bodies of animals poisoned in this manner, it was found that there was a total annihilation of all the properties of the nervous system; the reflex movements were found to be altogether lost; and in animals dead but for a minute, and still warm, the nerves were as inert as though life had been extinguished for a long time. The blood was found constantly black, coagulated with difficulty, and had entirely lost the property of becoming red on exposure to atmospheric air. It is asserted, from these facts, that the action of the woorara is very similar to that of the viper; and that the analogy is still stronger from the circumstance that, like the latter, it may be introduced into the stomach with impunity.

Experiments were then instituted with reference to this last point. In

[1] Experiments with the Woorali Poison; Lancet. Also, American Journal of Pharmacy, N. S., vol. v., 1840, p. 234.
[2] Reisen in Britisch Guiana. Von Richard Schomburgk. Band i. s. 456 (note).
[3] Comptes Rendus, tom. xxxi., 1850, p. 534 et seq.

the first place, it was found that when woorara was mixed with gastric juice, and the solution introduced into the circulation of animals, death uniformly followed. It is, hence, concluded that it is not from any alteration produced by the gastric juice that the poison is innocuous when introduced into the stomach. The other digestive fluids—the saliva, bile, and pancreatic juice—were likewise without effect upon the poisonous properties of the woorara. The inertness of the poison when ingested into the stomach was found to depend upon the fact that the gastric mucous membrane does not allow the toxic principle of the woorara to pass through it.

The following experiment is adduced as tending to establish this view:—

The fresh gastric mucous membrane of an animal (dog or rabbit), recently killed, was adapted to an endosmometer in such a manner that the mucous surface was on the outside. Into the instrument was then placed a solution of sugar in water, and the whole was plunged into an aqueous solution of woorara. At the end of three hours, although endosmosis had been effected, as shown by the elevation of the level of fluid in the tube, it was proven that the liquid contained therein possessed no poisonous quality; showing that the active principle of the woorara had not been transmitted. It was, however, determined that by allowing the arrangement to stand for a long time, the mucous surface became so altered as to permit the endosmosis of the poisonous agent.

It was also shown that the mucous membranes of the bladder, the nostrils, and the eyes were likewise impenetrable to the active principle of the woorara, and that only one mucous membrane of the body, that of the air-passages, was capable of absorbing this substance.

Vulpian,[1] in common with MM. Bernard and Pelouze, also found that the nerves very soon lost their irritability, and that the muscles remained excitable for a considerable period in animals poisoned with woorara. Contrary, however, to the results obtained by these last-named observers, he ascertained that the woorara, when introduced into the œsophagus or stomach of certain animals, as frogs, tritons, and toads, produced death. He also found that when thus administered the heart continued to beat for two or three days, whilst all the nervous functions were entirely abolished. Hence he concludes that the heart is independent of nervous influence.

The experiments of Brainard and Green, to which we have already alluded, will be further considered under another head, as will also the numerous and ably conducted investigations of Reynoso.

In a paper read before the Physiological Society of London, Cogswell,[2] among other conclusions, arrives at the following: That woorara is a poison when swallowed, that it acts primarily as a stimulant, and secondarily, or as it may be termed, specifically, as a sedative, paralyzing the functions of the nervous system both locally, when it is immediately applied to the body, and constitutionally after it enters the circulation.

We now come to Kölliker's[3] investigations, which for thoroughness and

[1] Comptes Rendus de la Societe de Biologie de Paris, t. i., 2d serié, 1854, p. 73.

[2] Lancet, March 3d, 1855.

[3] Physiologische Untersuchungen über die Wirkung einiger Gifte. Virchow's Archiv, Zehnter Band, 1856, s. 83 et seq. For conclusions see also Comptes Rendus, t. xliii. 1856, p. 791, and Proceedings Royal Society of London, 1857.

completeness have rarely been equalled. His conclusions are numerous, and appear to be deduced with his accustomed accuracy.

He found that the woorara acting through the blood destroyed the excitability of the motor nerves, the terminal branches losing their excitability in a few minutes, whilst their trunks did not become affected for an hour or two later. He is of the opinion that the sensory nerves are little if at all affected.

When introduced into the system through the mucous membrane of the intestinal canal, Kölliker found the woorara to act more slowly than through a wound, and that a larger dose was required. When applied to the skin of frogs, he found it altogether inoperative.

With reference to its effect upon the heart, it was determined that in amphibia this organ was but little influenced, as it continued to pulsate for many hours after poisoning was established. Owing to paralysis of the pneumogastric nerves, it was somewhat quickened in its action. He concludes, therefore, that the ganglia remain unaffected. The lymph hearts soon ceased to move.

When applied locally to nerves, woorara in concentrated solution was found to extinguish their excitability, but only after a considerable time. Applied directly to the brain and spinal cord, it was altogether without effect.

The conclusions in regard to the effect of woorara upon the sensory and motor nerves, though published before those of Bernard[1] on the same point, are similar to those which the latter had previously announced in his lectures.

In a second paper Vulpian details the results of further experiments with woorara. He confirms Kölliker's and Bernard's conclusions relative to its action on the nervous system.

He also investigated its effects upon the lymphatic hearts of frogs, and ascertained that under its influence they very soon ceased to beat.

Bernard's most complete researches relative to the action of the woorara are contained in the work to which we have already alluded. As this is so readily accessible to the members of the Department, we shall do no more than present the main results of his investigations. He found,

1st. That all reflex movements cease a few minutes after poisoning. The heart continuing to beat for a considerable time.

2d. That woorara is not absorbed from the mucous membrane of the stomach during digestion, bladder, or from the conjunctiva of mammals, but is readily taken up from the pulmonary and rectal mucous membranes of these animals. When introduced into the œsophagus or gizzard of birds, it is speedily fatal. Applied to the dry skin of frogs, it acts slowly but surely. In contact with the wet skin of these animals, it is not absorbed.

3d. Woorara abolishes the function of the motor nerves, but does not affect that of the sensory nerves. Muscular irritability is rather augmented than diminished.

4th. That woorara kills the nerves from the periphery to the centre, acting in this respect conversely to strychnia.

[1] Leçons sur les Effets des Substances Toxiques et Médicamenteuses.

5th. That it causes death by arresting the process of respiration, thus inducing asphyxia.

The experiments of Prof. E. Pelikan,[1] of St. Petersburg, tend to conclusions similar to those we have last quoted. This observer, however, found that the nervous irritability did not always disappear immediately after death, as stated by Bernard. Prof. Pelikan also found that when introduced into the intestinal canal, woorara exercised its ordinary effect, though more slowly than when acting directly through the circulation. Curarin obtained by the process of Roulin and Boussingault produced the same physiological effect as the woorara.

Having thus brought the history, the chemistry, and the physiology of woorara to the present time, we come, in the next place, to speak of our own researches. These have been conducted with all the care which such observations require. Though we have worked to a certain extent independently, every experiment instituted by one has been verified by the other, so that we are mutually responsible for the statements contained in this memoir. Moreover, observations and suggestions have been freely exchanged.

Original Researches.—The varieties of woorara which we propose to consider were brought, in February, 1857, from the Rio Darien, in the province of New Grenada, South America, by Drs. Ruschenberger and Caldwell, of the United States Navy. By them they were presented to Prof. Joseph Carson, of the University of Pennsylvania, who very generously placed all in his possession at our disposal.

The woorara thus obtained is of two kinds, one marked "*Woorara, variety Corroval,*" is asserted to be the strongest arrow-poison; the other, labelled "*Woorara, variety Vao,*" is not considered so powerful. So far as we are aware, these species of South American arrow-poisons have never yet been noticed by those who have written and experimented upon the subject.

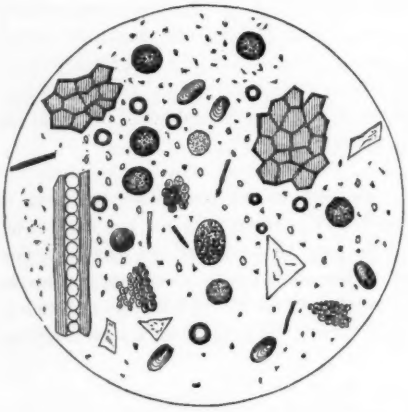
Our friend, Mr. Trautwine, late chief engineer of the Panama Railway, informs us that the arrow-poison employed by the Indians of the Rio Atrato, on the eastern side of New Granada, is not at all powerful. He states that he has frequently wounded birds, pigs and other animals with it without producing any marked result. The Indians, however, told him that they used a more virulent poison when they went to war, but if this be true, he was unable to obtain any of it. He has never heard them call any of their poisons by the name of corroval or vao.[2] In regard to the manner of manufacturing the varieties we refer to we have been unable to obtain as yet any information.

[1] Physiologische und Toxicologische Untersuchungen über Curare. Virchow's Archiv, Elfter Band, 1857, s. 401. See also Comptes Rendus, t. xliv., 1857, p. 507.

[2] Also Rough Notes, &c. By John C. Trautwine, C. E. Philad., 1854, p. 65.

CORROVAL. *Physical and Chemical Characters.*—The corroval when in large lumps is of a brownish black colour. Reduced to fine powder, it becomes a tawny yellow. The larger pieces have very much the appearance presented by vegetable extracts of the same colour. Its taste is intensely bitter and very persistent. The saturated aqueous infusion is of a very dark-brown almost black colour, and of neutral or exceedingly slight acid reaction. The alcoholic tincture is of a pale yellow tint. Both water and alcohol extract the active principle. The insoluble residue, viewed by the microscope, is seen to consist of vegetable cells, starch granules, and other vegetable structures, oil globules, &c. Small grains of silica are also to be observed. No parts of animals of any kind can be discovered (Fig. 1). It is very certain that these latter do not enter into the composition of corroval.

Fig. 1.



In the aqueous solution large colonies of infusoria are found, probably all of a vegetable character.

The aqueous solution mixed with blood does not retard its coagulation or alter the shape of the blood disks more than would any bland fluid of similar density. It is not at all poisonous to plants. We have inoculated tender flowers with it repeatedly without producing any effect upon them.

In order to separate the active principle from the corroval, the following processes were adopted:—

1st. Ten grains of the substance were extracted by repeated portions of boiling water, till a bitter taste was no longer afforded. The solutions were now mixed and boiled with magnesia. The whole was thrown upon a filter and the residue well washed with boiling alcohol. It was perfectly insoluble, showing, therefore, the absence of strychnia.

The filtrate was filtered repeatedly through animal charcoal, till all the bitter principle and colouring matter were absorbed. The charcoal was then treated with boiling alcohol in fresh portions till all bitterness was entirely extracted. The alcohol was then evaporated to dryness. By this process a greenish white substance, insoluble in water, was obtained. It was readily dissolved by alcohol, ether, or chloroform. It is not crystallizable. It forms salts with hydrochloric, nitric, and sulphuric acids, neither of which crystallize.

2d. The process employed in this instance was that used by Roulin and Boussingault, but modified by employing water to extract with instead of alcohol.

Ten grains of the corroval were reduced to fine powder and extracted with water, as in the first process. To the solution tannic acid was added, a voluminous flaky precipitate of a yellowish white colour was thrown down. This was well washed in a filter, to remove the tannic acid, mixed with water and heated to boiling, a few crystals of oxalic acid being added, till it was entirely dissolved. The acid liquor was next treated with magnesia in excess, and filtered. The filtrate was evaporated to dryness, and the extract thus obtained dissolved in hot alcohol. This solution evaporated to dryness furnished a substance similar to that obtained by the first process, but more highly coloured.

For the substance procured by the foregoing processes, possessing as it does all the qualities of an alkaloid, and in an eminent degree all the toxic properties of the corroval, we propose the name of *corrovalia*. We regret that we are unable, owing to the smallness of the quantity, to enter at present more fully into the chemistry of this interesting substance. From repeated observations we have, however, ascertained that it produces effects upon the animal organism precisely identical with those caused by the corroval itself, requiring, however, an infinitesimally smaller dose.

Physiological Investigations.—The action of corroval upon the animal organism is so entirely different from that of the ordinary woorara, as to indicate very strikingly its dissimilar composition. At the same time, the more obvious effects do not present any considerable variation. This is well shown from the following experiments:—

Experiment. A pigeon was inoculated near the cloaca with a little strong infusion of corroval. The bird at first exhibited no uneasiness. After the lapse of two minutes it walked a few steps, and began to show signs of discomfort. At the end of four and a half minutes it suddenly fell, flapped its wings once or twice, and died without further struggle.

Expt. A large owl was inoculated with a small fragment of corroval in the leg. Owing to the density of the tissues of the part, or to some other cause, the poison was not absorbed after twenty-five minutes had elapsed. It was therefore again introduced, in solution, under the left wing. After three minutes continuous movements of the muscles of the throat were induced. The bird staggered, let its wings fall, and appeared to stand with difficulty. About the end of the sixth minute it fell, and died without the least convulsive movement. The pupils were enormously dilated.

Expt. A mouse was pricked with a knife charged with a solution of corroval. It fell dead in three and a half minutes, without the slightest spasm.

Expt. Under the skin of a large frog a few drops of a strong solution of corroval were introduced. The animal remained, apparently, unaffected for twenty-five minutes; at the end of this period paralysis of the voluntary muscles commenced. When quietly laid upon the back, and the extremities stretched out, no effort was made to assume another position; when irritated, however, the extremities were withdrawn. The frog was entirely dead in forty-eight minutes—*i. e.* exhibited no motion of any kind to ordinary stimulus.

These experiments are sufficient to show the general effect and virulence of the corroval. It is perceived that, so far as these points are concerned, its action is very similar to that of the strongest woorara. There is no

tetanic spasm, a fact which sufficiently proves the absence of strychnia. As we shall presently show, however, when the action of the corroval is more physiologically considered, many important points of difference between it and the ordinary woorara will be found to exist.

Action on the Heart.—The woorara hitherto used by experimenters was found, as we have already seen, to exercise little or no direct influence on the heart. This organ continued to beat in all animals for a considerable period, and, even after it had entirely stopped, it could be made to resume its actions by artificial respiration. The action of the corroval is in this respect directly antagonistic, as will be perceived from the following experiments:—

Expt. A small frog was poisoned with corroval by inserting a minute piece of the substance under the skin of the back. The chest was then opened, so as to show more distinctly the action of the heart. During the third minute after the insertion of the corroval the heart beat forty-five times, and very irregularly. For the fourth minute the pulsations were but thirty. During the fifth minute the ventricle acted in a very singular manner, small portions of its tissue being apparently paralyzed, and bulging out, whilst the rest was contracted. The pulsations were but eighteen. In five and a half minutes from the inoculation the ventricle had entirely ceased beating, and had contracted to a very small bulk. It was hard and rigid, and of a pale-red colour, showing the entire absence of blood both from its tissue and cavity. The auricles continued to act for two minutes longer, when they also ceased. Instead of being contracted, the auricles were rather dilated. Galvanism was applied to the heart, without having the slightest effect in exciting it to action. The lungs or air-sacs were perfectly collapsed.

During the whole of this period the voluntary muscles were active. The frog struggled violently to escape, and finally succeeded in leaping to the floor. It remained active for twenty minutes. The pupils, which, at the time the heart ceased to act, were contracted, now became dilated, and all voluntary movements were abolished.

Expt. A pigeon was inoculated with a little strong aqueous solution of corroval. It fell dead in five and a half minutes, without convulsive action. The pupils were enormously dilated. The chest was immediately opened, and the heart was found to have ceased pulsating. Under the influence of a powerful galvanic current a few fibres contracted two or three times. It was incapable of further excitation. The ventricles were somewhat corrugated, and the auricles dilated. The peristaltic action of the intestines was readily excited by galvanism for about half an hour.

Expt. A rabbit was inoculated in the leg with a little strong infusion of corroval. In three minutes the animal exhibited great uneasiness, and constantly moved the jaws, as if chewing something. In six and a half minutes it fell dead, without the least spasm of any kind. The pupils were largely dilated. The chest was immediately opened, and the heart was found to have ceased pulsating. The ventricles were small and empty; the auricle contained a quantity of dark fluid blood. A single ventricular contraction was induced by galvanism.

Expt. The crural nerves of a very large frog were isolated, and a ligature placed under them and tied tightly so as to include all the tissues but the nerves. A large quantity of the aqueous solution of corroval was then injected under the skin of both legs. The chest was then opened, so as to show the movements of the heart. These did not seem to be disturbed, except by the impediment caused to the circulation by the ligature. After ten minutes the pulsations were forty-five per minute. At the end of half an hour the heart was still active, beating forty-eight times per minute. The ligature was now removed. The heart almost immediately began to exhibit the ordinary signs of the action of the corroval—viz., the partial paralysis and irregular contractions which it occasions—and in

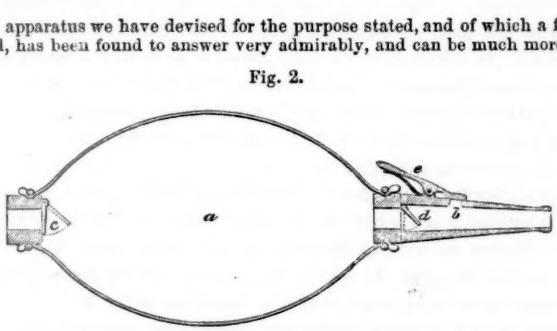
six and a half minutes the ventricle had entirely ceased to act. The auricles pulsated for two and a half minutes longer. No contractions could be induced by galvanism. Dilatation of the pupils ensued in twenty-five minutes, and all voluntary movements ceased.

From the foregoing experiments relative to the action of corroval upon the heart, which have been frequently repeated, with uniform results, we arrive at the conclusion that it acts directly upon this organ by being carried to it through the circulation. It is well known that in cold-blooded animals the respiration may entirely cease, and the heart nevertheless continue its action for a considerable period afterwards. These results, indeed, follow the poisoning of such animals by the ordinary woorara; and, as Brodie, Waterton, and numerous other experimenters, have shown, if the respiration be continued artificially in warm-blooded animals poisoned with this substance, life may be preserved; and even after the heart has ceased to act, it will again resume its movements under this influence. The discontinuance of the function of the heart through the action of the corroval must therefore be regarded as a primary effect, in no degree dependent upon the respiratory process, but due, as we have already stated, to the direct influence of the poison upon the heart itself. In order, however, to place the matter beyond doubt, the following experiment was instituted:—

Expt. The trachea of a cat was opened, and a tube introduced, to serve for the attachment of an apparatus for conducting artificial respiration.[1] A quantity of strong infusion of corroval was then injected under the skin of the flank, and the chest immediately opened. Artificial respiration was then instituted. The heart was actively pulsating. In a few moments its operation became irregular, and at length ceased entirely, seven and a half minutes after the introduction of the poison. The pupils, which at first were contracted, gradually enlarged to their fullest extent.

[1] The apparatus we have devised for the purpose stated, and of which a figure is annexed, has been found to answer very admirably, and can be much more easily

Fig. 2.



managed than the ordinary bellows. An India-rubber bag (*a*) has openings in both ends, into which two brass tubes are fixed, provided with valves (*c*, *d*). The tube *b* is attached to a tube of India-rubber, which, by a nozzle and stopcock, is inserted into the trachea. When the bag is squeezed, the valve *c* is closed, and the valve *d* opening, the air passes into the lungs. On removing the pressure, and raising the valve *e*, the air escapes from the lungs through it, the valve *c* opens, the valve *d* closes, and the bag again becomes filled.

The instrument was made for us by Messrs. J. W. Queen & Co., 924 Chestnut St.

The independence of the heart in relation to the respiratory process is thus fully shown, and one of the main points of difference between the action of the corroval and that of the woorara indicated. It is perhaps useless to bring forward further illustrations in support of the facts we have stated; but the following experiment is so apposite and conclusive, that we cannot refrain from adducing it:—

Expt. A young alligator, about a foot in length, was properly arranged, and the chest opened. The heart was beating thirty-six times per minute. A little solution of corroval was next introduced under the skin. The pulsations of the heart, five minutes afterwards, were thirty-four per minute. The respiratory actions were vigorous, and perfectly effectual. After twelve minutes the action of the heart commenced to be irregular, and the pulsations had fallen in number to twenty-eight per minute. The rhythm of the auricles with the ventricle was entirely reversed, and the former was very curiously corrugated. The heart ceased acting (both auricles and ventricle) seventeen minutes after the inoculation. The left auricle was of a pale-red colour, the right was black, the ventricle was pale and contracted. The heart stopped immediately after vigorous and long-continued respiratory movements. The lungs were well filled with air, and respiration was actively continued for sixteen minutes after the heart had ceased to pulsate. The pupils, which for a few minutes before the heart became affected were contracted to mere lines, were now dilated to a great extent, and all voluntary movements ceased.

From the foregoing experiments, we do not see how any other conclusion than the one we have stated can be adopted—viz., that the discontinuance of the heart's action is a primary result, and not due to the disturbance of any other function. Whether we regard the cause of its motion as being due to muscular irritability or to the ganglia found throughout its tissue, we cannot avoid the inference that both are powerfully influenced through the action of the corroval. In the experiment last stated we have seen that the rhythm of the heart was greatly disturbed, and that it continued to pulsate in the most irregular manner. We might adduce numerous other observations to the same effect. All this brings us to the conclusion that the ganglia are primarily affected, especially as from the contraction of the pupils and the cessation of the capillary circulation, to which we shall presently allude, we are led to infer the paralysis of the sympathetic nerves. No doubt, however, can exist that the muscular irritability of the heart is also completely destroyed, for no irritation, not even that of the strongest galvanic current, can re-excite its pulsations a minute after they have ceased; and even before the lapse of this short period we can obtain but one or two feeble manifestations of the force which once caused its throbbings.

We have as yet said nothing relative to the action of the corroval upon the *lymph hearts* of frogs. Without stating the experiments in full, we may say that, from frequent observations, we have convinced ourselves that under the influence of this agent they cease to pulsate in from twenty to thirty minutes after its introduction into the circulation.

We may here refer to the influence of the corroval over the *capillary circulation*. We have uniformly found it to be arrested one or two minutes before the ventricle stopped acting. We consider this to be due to paralysis of the sympathetic nerves.

Whilst viewing the web of a frog's foot, in order especially to satisfy ourselves relative to the above point, we have never seen any alteration in the size, colour, form, or number of the red or white corpuscles. We have already, however, stated our views upon this subject.

The action of the corroval upon the *nervous system*, though in one or two respects similar to that of the ordinary woorara, is, we think, in others materially different. The latter destroys all voluntary and reflex movements immediately; it acts exclusively on the motor nerves, leaving the sensitive nerves unaffected, as Bernard has satisfactorily shown. As we have demonstrated, the first action of the corroval is directly upon the heart, and hence we have one important point of difference in the effects of the two poisons. In considering the action of this substance upon the nervous system, we shall indicate other points of dissimilarity.

1. *Influence of Corroval upon the Voluntary and Reflex Movements.*—*Expt.* A large frog was inoculated with corroval under the skin of the back. The heart ceased pulsating in seven and a half minutes. The frog continued active for twenty minutes after the insertion of the poison, and at the end of twenty-five minutes all voluntary movements had ceased, paralysis first occurring in the anterior extremities. If now an extremity was irritated, it was immediately withdrawn, and galvanism applied to one foot excited movements in all the others. This condition remained for forty-five minutes after the introduction of the corroval, when it was changed, and reflex movements could only be excited in the nictitating membrane. In one hour and five minutes all reflex movements were lost.

Expt. A young alligator was inoculated with corroval under the skin of the flank. The heart ceased acting in seventeen minutes, and in thirty-five minutes all voluntary movements were abolished, the anterior extremities first losing the power of motion. Upon pinching the tail, violent reflex motions were excited in all parts of the body, including the lungs, and strong respiratory movements were produced. They were readily excited for more than an hour and a half after the stoppage of the heart.

Numerous other experiments could be adduced to the effect above indicated—viz., that in cold-blooded animals the voluntary and reflex movements remain for a considerable period after the cessation of the heart's action, and consequently much longer than after poisoning with the ordinary woorara. At first sight it appeared to us that the abolition of these manifestations of the integrity of the brain and spinal cord, which eventually occurred, was due to the direct action of the corroval; but after the institution of other experiments, and a fuller consideration of the subject, we have arrived at a very different conclusion. In order to ascertain the effect upon the brain and spinal cord of the cessation of the heart's action, or, what amounts to the same thing, the prevention of the passage of the blood to or from them, we performed the following experiment:—

Expt. The chest of a large frog was opened, and a ligature placed around the vessels at the base of the heart. All voluntary movements ceased in twenty-five minutes; and at the end of fifty-five minutes no reflex actions could be excited in any part of the body. The sciatic nerve of the left posterior extremity was exposed, and, on being irritated, strong contractions were produced in the muscles of the leg. This condition was present at the end of two and a half hours.

The experiment was frequently repeated, with uniform results. The voluntary movements always ceased in from twenty-five to thirty-five minutes, and the reflex in from fifty minutes to an hour and a quarter, after the ligation of the vessels. We consequently feel warranted in concluding that the cessation of these actions in animals poisoned with corroval is an indirect effect resulting from the cessation of the function of the heart, and therefore not due to any specific effect upon the brain or spinal cord.

2. *Action upon the Nerves and Muscles.*—The woorara, as experimented with by Bernard, Kölliker, and others, was found to immediately destroy the excitability of the nerves, leaving that of the muscles unaffected, or perhaps augmented. We have not found this to be the case with the corroval, as the following experiments will show:—

Expt. A large frog was inoculated with a little strong solution of corroval. The movements of the heart were arrested in seven minutes. Voluntary motion ceased in about twenty-five minutes, and the reflex in about an hour, after the introduction of the poison. The sciatic nerves of both posterior extremities were now exposed. Upon gently pinching either of them, strong contractions were produced in the muscles of the corresponding leg. They remained excitable to galvanism for an hour longer. The muscles were irritable fifteen minutes after excitability was lost in the nerves.

Expt. A cat was inoculated with corroval. Death followed in about five minutes. The sciatic nerve of the right leg was exposed, and, on irritating it, strong contractions were produced in the muscles of the extremity. The nerve continued irritable to galvanism for twenty-six minutes after death, the muscles for thirty-five minutes.

Expt. A pigeon was killed with corroval, death ensuing four minutes after the introduction of the poison. The sciatic nerve was irritable for seventeen minutes subsequently. The muscles retained their irritability for twenty-two minutes.

From these experiments we see that nervous excitability remains for a longer period than in cases of poisoning with woorara. This function is nevertheless affected by the corroval, for, as we have seen, it remains much longer present in animals whose circulation has been arrested by ligature of the large vessels. Consequently the mere deprivation of oxygenated blood, or the retention of that which is not decarbonized, cannot be the cause of its abolition, and we must therefore ascribe it to the direct action of the poison.

We also perceive that the muscular irritability was lost very soon after that of the nerves, and consequently we have here another point of difference with the woorara. It may perhaps be thought, by those who disbelieve in direct muscular irritability, that the reason why the muscles appeared irritable after the loss of excitability in the nerves was due to another cause—viz., the retention of this faculty in the minute ramifications of the nerves after its loss in the larger trunks. In relation to this point, we think we can show that the corroval, like the ordinary woorara, causes the death of the nerves from the periphery to the centre, and, consequently, that the minute ramifications lose their vitality before the larger trunks. In illustration we subjoin the following experiment:—

Expt. A few drops of the strong infusion of corroval were introduced under the skin of the back of a large frog, the sciatic nerve of the left side having been

previously cut. The heart ceased to act in eight minutes—voluntary and reflex movements ceased respectively in thirty and fifty-five minutes. The sciatic nerve of both sides were excitable, the left in a less degree than the right. After the lapse of an hour and a half, the left nerve had entirely lost its irritability, whilst the right was still excitable, and remained so for twenty minutes longer.

With strychnia, however, the effect is far different, this substance destroying the nervous excitability from the centre to the periphery, as the following experiment shows.

Expt. Under the skin of a large frog, whose left sciatic nerve was previously divided, a few drops of a strong solution of strychnia were introduced. Tetanic spasms ensued in two minutes. After forty-five minutes the nerves were irritated by galvanism. That of the left side, which had been cut, responded energetically, whilst no motions could be produced through the uncut nerve. The former remained excitable for two hours later. Muscular irritability was strong in both legs. The experiment was not further pursued.

We infer from the foregoing experiments that the irritability of the muscles is a faculty entirely distinct from the irritability of the nerves, and that accordingly it may be present after the entire abolition of the latter. The fact that the corroval destroys the excitability of the nerves from the periphery to the centre, acting first upon the small branches, and subsequently upon the larger trunks, is, we think, abundantly shown. Hence the contractility exhibited by the muscles on being galvanically irritated could not be due to excitability remaining in the minute nervous radicles.

With reference to the effect of woorara upon the sensory and motor nerves, it was found by Bernard and Kölliker that the latter first lost their vitality, the former not being directly affected. By confining the action of the poison to certain portions of the body, Bernard obtained movements in a non-infected limb by irritating one that was fully poisoned. Hence he proves that the woorara does not affect the integrity of the sensory nerves. We have performed his experiments frequently, substituting corroval for woorara, without obtaining his result. They are as follows:—

Expt. The vessels of the left posterior extremity of a medium sized frog were ligated, and all the tissues, with the exception of the sciatic nerve, divided. The limb was consequently only connected with the body through the medium of the nerve. The animal was then inoculated with corroval high up in the back. The movements of the heart were arrested in six minutes—voluntary and reflex movements ceased about the usual time. On irritating either of the anterior extremities, or the posterior leg which was not cut, no motions were excited in the left posterior extremity, showing, therefore, that sensation was entirely destroyed by the corroval. The irritability of the muscles subjected to the influence of poison was lost in one hour and fifty minutes after the inoculation, whilst it was present in the non-poisoned limb sixteen hours afterwards. The animal was not further observed.

Expt. The sacrum of a large frog was carefully removed, and the crural nerves isolated by passing a ligature around the body so as to include all the tissues but the nerves in question. This was tightly drawn and tied so as effectually to prevent the circulation of the blood in the posterior extremities. The frog was now inoculated with a solution of corroval in the manner last stated. The heart ceased to act in six and three-quarter minutes—voluntary movements were abolished in thirty minutes, and all reflex actions were lost in fifty-three minutes after the introduction of the poison. Strong galvanic irritation was now

applied to the anterior extremities, and although muscular contractions were induced in them, there were no reflex movements in the posterior extremities. The sensory nerves had therefore lost their faculty of conveying impressions. Muscular irritability was extinct in all the anterior portions of the body at the end of two and a quarter hours. The muscles of the posterior extremities retained their irritability for twenty-two hours. The experiment was not further continued.

From these experiments it is perceived that the corroval, unlike the woorara, destroys sensation, and that so far from augmenting the irritability of the muscles, this faculty is also annihilated.

Bernard found that in animals poisoned with woorara, the muscles were red as if they contained a considerable quantity of blood. In all cases of corrovalic intoxication the reverse is the fact, provided, of course, that the circulation has not been mechanically impeded by ligatures, &c.

Absorption of Corroval.—Corroval is readily absorbed from the mucous membrane of the stomach, and from the external surface of the skin of frogs. The following experiments are cited in illustration of this point:—

Expt. Ten drops of the strong solution of corroval were placed in the stomach of a large frog. The chest was then opened. The heart was pulsating 50 times per minute; in a minute or two afterwards, the contractions of the ventricle became very irregular, the partial paralysis was present, and it ceased to act in five minutes after the introduction of the poison. The auricle stopped two and a half minutes subsequently. Slight convulsions of a clonic character now appeared in the posterior extremities, and lasted for a few minutes. The ordinary symptoms of corrovalic intoxication then ensued in regular order.

We mention it as a singular circumstance, that in all cases in which we have given the corroval internally, there were convulsive movements of the posterior extremities as above, whilst we have never seen them in frogs where it was introduced directly into the circulation.

Expt. Ten drops of the strong solution of corroval (twenty grains to the ounce) were placed upon the back of a large frog. After the lapse of fifteen minutes the chest was opened. The heart was still pulsating actively. After ten additional minutes five more drops were placed upon the back—in a short time it began to act, and thirty-five minutes after the first introduction of the poison the heart ceased. The other consequences followed in due succession.

We deem it unnecessary to enter more fully at this time into the discussion of the questions connected with the absorption of the poison, or to bring forward other experiments. They will be considered more at length under another division of our subject.

From the foregoing experiments and observations in relation to the corroval, we deduce in the main the following conclusions:—

1st. That it differs essentially from any variety of woorara hitherto described, both in its chemical constitution and physiological effects.

2d. That it acts primarily upon the heart, through the medium of the blood, producing an arrest of the action of this organ.

3d. That the annihilation of voluntary and reflex movements is a secondary result of its action, depending primarily upon the discontinuance of the function of the heart.

4th. That it acts upon the nerves from the periphery to the centre, and abolishes both the sensory and motor functions.

5th. That it destroys muscular irritability.

6th. That it paralyzes the sympathetic nerve, this being one of its primary effects.

7th. That it is absorbed both from the intestinal canal and skin of frogs.

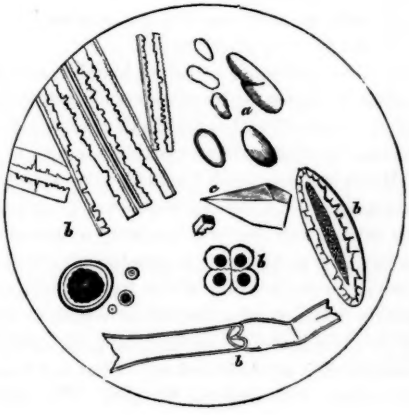
8th. That its poisonous qualities are due to an alkaloid hitherto undescribed.

VAO OR BAO.—The variety of arrow-poison of which this portion of our paper treats is, without doubt, a different material from the ordinary woorara used in Europe. At first we were disposed to regard the vao as a weak specimen of the same material which M. Bernard, Kölliker, and others have studied; but a long and patient investigation of its properties and physiological reactions has forced us to the conclusion that vao poison, although it presents some points of resemblance to the arrow-poison of Waterton, De la Condamine, and the later observers, is essentially a distinct and different substance. Indeed it is by no means unlikely that the various tribes of South America employ different but allied agents to furnish the arrow-poison whose use seems to be so general in that part of the world, and we are surprised that no specimens of the varieties before us have as yet found their way into the hands of European physiologists.

We shall now proceed to consider in order the physical, chemical, and physiological characteristics of vao.

Physical and Chemical Characters.—The vao in our possession is a dark-brown extract, perfectly dry and hard, and unaffected by exposure to the air. It is partially soluble in water and alcohol. The insoluble portion consists of a white or light gray deposit, of a shred-like and flocculent appearance. Examined under the microscope, this is found to be principally amorphous matter with a considerable admixture of starch-cells (Fig. 3, *a*), and various forms of entire or broken cells, all of vegetable origin (*b*). A few broken crystals are also found (*c*), but no indications whatever of the

Fig. 3.



presence of any relics of animal tissues, such as we should naturally look for were snake-heads and ants employed to make up this deadly material. The solutions of vao are of a tawny yellow hue, and are feebly acid.

In the chemical examination of vao, the same processes were employed as were resorted to in analyzing corroval, and an alkaloid was obtained, which differed in no essential physical or chemical character from that of corroval. When, however, equal quantities of corroval and vao were analyzed, the latter material yielded the smaller amount of alkaloid. The result of the physiological comparison of the two substances extracted from the poisons in question will be found elsewhere.

Before proceeding to study the effect of vao upon the tissues and organs, it will be well to present a general view of the symptoms and appearances offered to the eye by an animal poisoned with it, reserving their interpretation for after consideration.

Expt.—A morsel of vao was introduced under the skin of the belly of a large frog. No remarkable symptoms were noticed during the first twenty-seven minutes. The frog leapt about as usual, making violent efforts to escape from the receiver. At the close of this time his fore legs were weak. Twenty minutes later the hind legs were also weak, and although he remained in any unusual posture in which he might be placed, he still retained the power to move, apparently at will, and when irritated. Fifteen minutes later all volitional control had departed in the extremities, although he retained the power to lift his head, and exhibited reflex motions of one leg when the other was irritated. At the close of the next hour the reflex acts ceased, the eyelids being the last muscular part which responded by reflex acts to external applications. Three hours and fifty-seven minutes elapsed between the inoculation of the vao and the loss of motor power in the lids. It is also to be observed that the frog continued to use the respiratory muscles of the lower jaw, and more rarely of the flanks, some time after he had lost all voluntary control of the extremities.

The order of externally visible phenomena is therefore as follows:—

1. Loss of power in the fore legs.
2. Loss of power in the hind legs.
3. Loss of reflex manifestations in the extremities.
4. Respiratory efforts cease.
5. The eyelids are no longer irritable, and do not close when touched.

In a few cases the frogs also exhibited convulsive motions, the hind legs being extended with considerable force, but not remaining rigid in this posture, as occurs when strychnia has been used.

When a warm-blooded animal, as a rabbit, is the subject of the action of vao, no marked symptom is observable until the head begins to droop and the animal crouches on his belly at the close of about twenty minutes. Before this occurs there is sometimes noticed a chewing movement of the jaws and some gritting of the teeth, a symptom which is often marked in rabbits poisoned with tincture of veratrum viride. At the close of fifteen or twenty minutes, as we have said, the head begins to sink, is jerked up, falls lower, is again jerked up, and at last is no longer lifted. Meanwhile the animal falls over on his side. The respiration becomes weaker and

less frequent. The heart beats more slowly. Slight convulsive motions of the ears and hind legs occur. The pupil, previously contracted, dilates, and in some cases the muscles of the skin are affected with a general movement. At last the respiration ceases, and the lids are no longer irritable. Meanwhile the heart is still acting feebly, and the temperature has fallen. After death the pupil contracts, and post-mortem rigour succeeds at an interval of from one to five hours.

The time required to destroy a rabbit is usually about half an hour or forty minutes, when the poison is introduced under the skin. Pigeons similarly treated die within fifteen minutes.

It will be seen from these statements that vao poison acts less rapidly than corroval, or the ordinary woorara of European observers. And this was even more manifest in the case of a cat whose symptoms differed very remarkably from those already described.

Expt. A large black cat received in the thigh a lancet-point charged with dried vao. After two minutes it was withdrawn, and found to have lost most of its poison. During thirteen minutes the animal showed no marked signs of the action of the vao, except a tendency to rest couched on her breast, and some indisposition to move about. Two minutes later she rose to her feet and made the same motions of swallowing and chewing which we have noticed in the rabbit. These proved to be the first symptoms of a violent vomiting which followed almost immediately. This action accomplished, the cat again rested on her belly, her head drooping as before, until after eleven minutes had passed, the chewing movements began again, and another violent attack of vomiting brought her to her feet. On this occasion only a little mucus was rejected. The head again sunk as she lay down, the respiration became short and quick, and the heart beat more slowly. Forty minutes after the vao was used she could still raise her head, and the eyes followed the motions of a candle passed to and fro in front of them. In the next five minutes the head fell on one side, and the body rolled over a minute later, the pupils dilating to their utmost extent. Fifty-five minutes after the vao was given the cat died in the most frightful general convulsions, with foaming at the mouth, vomiting, and ejection of urine and feces.

The difference between the external symptoms in this animal and the rabbit is as great as the effect produced on one and the same species of animal by two dissimilar poisons.

M. Bernard has never seen vomiting caused by woorara, but we cannot find that he has experimented with cats.[1] Virchow had already noted the fact that the cat is subject to convulsions when poisoned with woorara, and in this respect the vao poison resembles it. Cats are, however, so liable to convulsions that almost all poisons produce them, and very trivial causes will bring them on in kittens apparently in health. Thus we have seen a cat frightened into wild epileptiform convulsions.

Absorption.—In this connection it is still to be held in mind that the

[1] The chewing movement which we have described as preceding the act of emesis in the cat, was also noted in nearly all of the warm-blooded animals poisoned with either corroval or vao. In one of them, a pigeon, vomiting took place. It is possible that the peculiar movements alluded to may be indicative of the existence of nausea which does not reach the actual climax of vomiting.

variety of woorara poison which we have now in view is far less active than the woorara examined by Bernard and Kölliker, and even less so than the corroval of which a portion of our paper treats.

The phenomena which announce the absorption of the vao are therefore slower in appearing, and have sometimes to be awaited a considerable time. The actual length of time required for absorption to occur is, however, of less moment than the facts relative to the absorbing power of the various tissues with which the poison may be placed in contact, and the exterior circumstances which seem to be influential in determining the rate of absorption.

Most of our experiments have been made upon frogs. We shall detail the results with reference to the various tissues.

Areolar Tissues.—When a morsel of vao was placed under the skin of a frog death inevitably ensued, whether the animal was left in dry or moist air, or in water, and no important difference was observable in these several cases, save that when a solution was employed the death was more rapid than when the solid poison was used. Thus, a frog of middle size received under the skin of his back a morsel of vao. In four hours all motion, voluntary and reflex, had departed. A second frog, of rather larger size, having received in his subcuticular sac the same amount of vao dissolved in water, perished in forty minutes.

The same general rule applies to those warm-blooded animals upon whom the poison was tried. An equal amount of vao being placed under the skin in two rabbits of about the same size, the one which received the vao in solution perished in eighteen minutes, while the other lived for half an hour.

Absorption by the Skin.—Vao, like woorara, is best absorbed by the skin of the frog, when the skin is comparatively dry, a fact which is due to M. Bernard, and which he conceives to be owing to the constant exhalation of a viscous and protective mucus, which is abundant when the frog is in, or just removed from the water, and which is scarcely observable when the frog has been long out of that element. The following experiments sufficiently illustrate these facts with reference to vao.

Expt.—A large frog which had been kept under a receiver open at top during several days, was found to have a skin much less lubricated than that of a frog kept in water. The skin at the middle of the back was cleaned with a piece of cotton wadding, and a small portion of a paste composed of vao was put upon the spot thus deprived of its mucus. The frog being replaced in the receiver, at the end of seven and a half hours all motion was lost.

Expt.—A frog of smaller size was so imprisoned in a net of wire that he remained with about half of his body under water. Upon his back was put a smaller amount of vao paste than was used for the last frog, but the situation chosen was the same, no attempt being made to rub off the mucus. Although the vao was twice renewed within forty-eight hours, no accident resulted to the animal, nor was he to appearance in any way affected by it.

That, however, the amount of absorbing surface exposed to the action of the poison may modify the result very materially, was seen in the following experiments:—

Expt. A small but very active frog, which had just been removed from the water, had one leg imprisoned in a piece of thin caoutchouc tubing, which was

well filled with cotton saturated with an aqueous solution of vao—one grain to the ounce of distilled water—a morsel of the solid poison was also thrown into the tube, and the open end closed with slight pressure around the leg, above the knee. At the end of four hours and forty-five minutes, reflex motions were no longer to be excited by galvanism.

Expt. The last described experiment was repeated with the single variation of placing the frog half under water, taking care to keep out of the water the leg which was in the tube and surrounded by poison. At the close of five hours no effect was visible. At the end of twenty-five hours the frog was sluggish—three and a half hours later all movement, reflex and voluntary, was over.

These two experiments, with others of a like character, seem to show that when a large amount of surface is exposed to vao in solution, and but half of the remainder of the body placed in water, absorption may occur; the same result being attained in a far shorter period when one leg being kept moist with vao, the rest of the body is exposed to the desiccating influence of the atmosphere.

Now that the production of mucus does protect the frog to some extent cannot be doubted, and has been proved by M. Bernard with his usual experimental skill. It will be seen, however, from the next set of experiments, that the amount of moisture in the system of the frog has much to do with his power to absorb the vao in solution, so that it is not only the exudation of mucus, but also the excess of watery supply which enfeebles the absorptive process. When the frog is dried more or less by long exposure to the air, his body eagerly takes up the moisture which is presented to any part of the surface. When, on the other hand, his body is thoroughly moistened, and the supply of water is in contact with the larger part of his surface, the power to absorb an aqueous fluid of a higher specific gravity than water from any one part of the surface is considerably lessened. Of course the presence of water is essential to the production of the viscous mucus, which is supposed to be the means of protecting the wetted frog, but it is also probable that the varying supply of water regulates the rate of absorption of aqueous solutions placed in contact with a part of the skin, or, as we shall now show, in the interior of the digestive canal.

Absorption from the Digestive Canal.—Expt. A small frog received in his stomach thirty drops of a solution of vao, one grain to the ounce of water. The dose was given through a glass tube, whose edges were carefully rounded that the mucous membrane might not be wounded. None of the poison escaped. The frog was placed on a damp cloth in a receiver containing a wetted sponge. At the end of nineteen hours and fifteen minutes he was found to be inert and sluggish, though still able to raise himself when suspended by one leg. In twenty-two hours longer he was unable so to lift himself. Seven hours later all motion had departed—the bared muscles were feebly irritable to galvanic stimulus, and the heart beat in successive minutes 2, 2, 2.

Expt. A second frog which had received the same dose in the same way, and at the same time, and which had also been placed in like circumstances, died during the ensuing night.

Expt. A small frog received thirty drops of the same solution and was at once placed in water. At the end of four days he was perfectly well.

Expt. Two small frogs received each of them thirty drops in the stomach,

and were placed together in water. No. 1 lost all reflex and voluntary motions at the close of twenty-four hours. On examination no sufficient cause could be found to explain his early death.—No. 2 was well and active after five days.

Expt. A small frog received in his mouth a morsel of vao, which he twice rejected—it was finally placed far back and to one side. He was then left upon paper, that the poison might be seen if again rejected; a large receiver was then placed over him and he was left to himself at 12 M. He died during the ensuing night.

It follows from these experiments that vao in the dose here stated is poisonous to frogs when placed in the mouth or when directly carried into the stomach. It will also be observed that the frogs which, after receiving this dose, were placed in water, suffered but little—one out of three perishing within four days, while frogs of the same size who were treated in like manner, except that they were confined in an atmosphere more or less dry, one and all suffered from the poison. Still, as it was possible that the frogs which, being placed in water, survived, might have rejected the poison, or diluted it largely and frequently by swallowing the water in which they were placed, it became necessary to test this negative result.

Expt. Accordingly a frog of middle size received in his stomach by a tube thirty drops of the one-grain solution. Three wire ligatures were next carried through the skin of the upper and lower jaw, at a little distance from the lips, and firmly twisted, so that no water could easily enter or leave the mouth. Thus prepared, the frog was suspended in water, his head alone remaining above the surface. At the close of the second day he was rather sluggish, but on being released and allowed to remain at liberty for a time he did not seem to have been materially affected. Replaced in the water, he was observed at intervals up to the close of the fourth day, when, as he seemed in no wise the worse for the poison, he was set free, and the observation ceased. It is not, therefore, direct dilution with water which renders the ingested poison so harmless to frogs kept in that fluid.

The power of different parts of the intestinal canal to absorb the vao poison was also the subject of numerous experimental tests. The stomach was the organ first essayed, and to try its absorbent powers, we utilized a fact in the physiology of the frog which has been known to one of the authors of this paper for some time, but which we do not find elsewhere referred to. Under certain circumstances, a detailed account of which will be found in a note, the frog can be made to evert first the œsophagus and then the stomach, so that it is literally turned inside out, and projects from the mouth, its internal or mucous coat being exposed to the air.[1]

[1] Some time since, one of us, Dr. Mitchell, observed that when an irritating substance, such as tinct. veratrum viride, is poured into the mouth of a frog, the animal sometimes, by a sudden effort, everts the œsophagus, and then the stomach, so that the mucous surface of the latter organ projects from the mouth. If the frog be left to himself, he remains rather sluggish for a time, and finally returns the viscera to their usual places apparently none the worse for this extraordinary performance. Suspecting that the pressure upon the abdominal walls, which cannot well be avoided when holding a frog, might have been influential in forcing the stomach out at the mouth, an attempt was made to produce the result in this manner alone, but without success. Since these facts were observed, Dr. James Darrach informs us that he has twice seen frogs who had thus everted the viscera while in water and at perfect liberty. At all events, it is very difficult by any manage-

Expt. A large frog thus prepared received on his everted stomach a morsel of vao made into a paste with a little water. A portion of the mucous membrane of the œsophagus at some distance was then secured in the grasp of a Liston forceps, and the shank of the handle slipped over a nail which was driven into the table. One of the fore feet of the frog was next secured by a wire so that he could not return the viscera to the belly again. A morsel of vao being placed on the surface of the stomach, he ceased to move in ten hours.

Expt. In this case the lower jaw-bone was divided on both sides, so that he would be unable to aid himself by forcing the stomach into place again. Notwithstanding this precaution, the frog reverted his stomach after the lapse of some hours, but not before he had exhibited indubitable signs of being poisoned. He died within twenty-four hours of the administration of the vao.

Expt. Two frogs were similarly treated, except that no vao was placed upon the everted organ, and that in one case the stomach was transfixed with a needle and thus retained in its strange position during twenty-four hours. The other frog restored the viscera to their places within two hours. When the needle was withdrawn from the stomach of the first frog, he made no immediate effort to replace his organs. Being put in water he seemed sluggish, but on examination next day proved to have succeeded in re-arranging his disturbed anatomy. Both frogs were well three days later.

In these experiments the stomachal mucous membrane was rather dry, and the whole organ much congested. The effect was less rapid than in the following experiment, where no doubt the local circulation was less interfered with.

Expt. The abdomen of a large frog being opened, the stomach was drawn out, and a ligature tied around the pyloric extremity. A morsel of vao was next slipped into the stomach through a slit in the œsophagus, and ligatures placed about the cardiac end of the viscus, and about the œsophagus above the wounded part, which was carefully excised. The vao acted fatally within two hours, an unusually sudden effect to be produced by this mode of using it. Lest a minute portion of the vao might have been left upon the wounded œsophagus, the experiment was repeated, with the variation of using a small tube through which the vao was carried into the stomach without opening the œsophagus, which was, however, tied just above the stomach. Poisoning took place in this experiment within five and a half hours. The frogs used had been just removed from water, and were afterwards left under bell-glasses, as usual. Still, the effect was rapid. On examining the stomachs after death, we could not see that the ligatures had cut the internal coat, although they undoubtedly did bruise it, and perhaps imperceptibly tore its delicate surface.

Absorption by the Mouth and Œsophagus.—Expt. The belly of a frog of middle size having been opened, and the œsophagus tied, the wound was closed, and a morsel of vao placed in the mouth. At the close of eighteen and a half hours he was active and well; a little jelly-like mucus could be seen at the back of his throat, tinged with the dissolved vao. Five and a half hours later his fore legs were feeble, and he could no longer lift himself by one leg when held suspended by it. Twenty hours later he was found devoid of motion in his limbs. The nerves were no longer irritable, but the heart beat three, three, three in successive minutes.

Expt. A small frog was poisoned by the subcutaneous administration of the

ment, short of the means first mentioned, to obtain this result, without the co-operation of the frog. It is probably a mode of vomiting, and a normal physiological act. For purposes of experiment, such as those described in the text, the stomach may be everted by firmly pressing the belly with one hand, and with the other passing into the stomach a thermometer with a bulb larger than the stem. As this is withdrawn, partial eversion of the organs occurs, and may be made complete by a little manipulation with a pair of forceps carefully used.

vao, which was still found after death, dissolved, in the buccal mucus of the subject of the last experiment. The mucus, therefore, does not alter the poison.

Absorption by the rectum takes place both in frogs and higher animals with considerable ease.

Expt. A morsel of vao, placed in the rectum of a small frog, produced death within thirty-nine hours.

Expt. A very large frog was opened, and the rectum divided. A morsel of vao was passed through a tube into the lower segment of the rectum, and ligatures were cast about the cut ends of the intestine, which was finally returned to the abdomen, and the wound sewed up. The frog was left under a bell-glass containing a damp sponge. He was not observed until twelve hours had elapsed, when he was found dead; the heart not beating, and the muscles scarcely irritable by galvanic stimulus. No trace of the poison could be seen in the rectum, except a small white shred, like the undissolved portion of vao which forms the sediment in its aqueous solutions.

Expt. A small rabbit, into whose rectum was thrown an injection of vao containing about one-eighth of a grain, perished within one hour, notwithstanding that he had rejected a large part of the poison.

The vao poison is, therefore, readily absorbed by the rectal mucous membrane, as was also found by other observers to be the case in their own experiments. It follows, as a general deduction from our researches upon the absorbing power of the various tissues for vao poison, that the rectum, stomach, and mouth in the frog are all capable of admitting the poison to the system through their mucous surfaces; absorption by the skin or stomach being governed, as to its rapidity, by the needs of the system for aqueous fluid.

The subject of absorption was further studied in warm-blooded animals, to ascertain whether the state of the stomach and system would affect the activity of the poison. It has already been mentioned, in the early part of this essay, that Fontana and Bernard had noticed that during digestion woorara could be ingested with an impunity which did not exist in the fasting animal. This statement we have found to hold good as regards rabbits to whom vao had been given during a fast or during digestion. Those who were not digesting always died. This is the more curious because the stomach of the rabbit is never empty, and the mere fact of the mixture of the poison with the food cannot therefore be supposed to be the protective influence. M. Bernard finds an explanation of these curious facts in the circumstance that woorara, placed in contact with the outer wall of the mucous coat of a fresh stomach, will not pass through it to a solution of sugar on the other side of the membrane. The water in which the woorara is dissolved alone endosmoses to the syrup, and the poison is left behind. It is to be presumed that the mucous coat of the fasting stomach would permit of the passage of the poison; but as M. Bernard does not tell us in what functional condition were the stomachs when removed for his experiments, we are still somewhat in the dark.

It may be well to remark, in confirmation of M. Bernard, that the rule of protection is not absolute and without exception in animals who are

digesting, since, when large doses—as one-fourth to one-half a grain—of vao are used, a death sometimes occurs even where a full meal has been previously taken.

Two very interesting experiments were made to ascertain whether the condition of the system of the rabbit, as regards water, would be found to modify the facts just stated.

Expt. At different periods two large rabbits were kept on hay and corn, and without water, for nine days. At the close of that time they were deprived of food during twenty-four hours. A feed of hay was then allowed them, of which they ate greedily. An hour and a half later in one case, and two hours later in the other, they were obliged to swallow respectively one-fourth and one-half a grain of vao broken into coarse powder. They were then allowed to drink freely. Neither animal suffered. One of them was killed three days afterwards, by introducing a minute morsel of vao under his skin. The other (seven days later) is still alive. We regret that our engagements oblige us to defer the fuller consideration of this interesting subject to another occasion, when we hope to be able to offer to the Department a more satisfactory explanation of the facts above stated than has been hitherto given.

Circulation and Respiration.—The following statements of experiments upon the effects of vao on the cardiac and respiratory movements are selected as illustrations from upwards of twenty separate records of distinct experiments upon frogs and warm-blooded animals:—

Expt. A frog of middle size was selected, and the heart exposed by cutting out a triangular piece of the front of the thorax. His heart was beating forty-eight per minute, and with great regularity. After a short lapse of time, to permit any excitement consequent upon the operation to subside, the pulse was again noted at forty-eight, and a morsel of vao was placed in a small cut in the liver. In fifteen minutes the heart pulse fell to thirty-two. Three minutes later it was twenty-seven. Again, in three minutes longer the ventricle, after some irregular movements, ceased to act. Five minutes later the auricles were beating three times a minute, and the respiratory motions of the under jaw continued. Forty-seven minutes from the time at which the vao was inserted the auricular motions also ceased. The respiratory efforts were still visible, although very feeble. The heart still responded to the galvanic stimulus for upwards of twenty-five minutes. After the heart had ceased to act the frog leaped about actively, and seemed in no respect the worse for the operation until a longer period had passed by.

Expt. A large frog received a morsel of vao under the skin of his back. At the close of forty minutes we exposed the heart. It was beating twenty per minute. Ten minutes later the auricles alone acted, and shortly afterwards all motion ceased, although the frog was still active. The auricles continued to respond to galvanism, by single beats, during another half hour. At this time the nerves and muscles were still irritable to mechanical stimulus and to that of galvanism.

Expt. A small frog received in his back a morsel of vao. At the close of an hour his heart was exposed; the ventricle beat feebly ten per minute. Ten minutes later the auricles alone moved. Again, in five minutes these also were at rest, although the whole heart responded well to galvanization during forty minutes longer. The nerves continued irritable some time after the heart ceased beating, and the muscular irritability elsewhere survived that of the heart.

Expt. A large frog was poisoned by injecting a solution of vao into the subcuticular sac of the belly. At the close of one hour, and while he was still active under stimulus and restive when held, the heart was exposed. It beat twenty-nine per minute. Twenty minutes later the auricles alone acted, though the ventricle responded to galvanism by single pulsations. The auricles were at rest after eight minutes more had passed, and when the extremities were becoming

affected by the vao. The auricles continued to act feebly when galvanized at intervals during the two succeeding hours, and while the nerves had entirely lost their irritability under stimulus of any kind.

The general muscular irritability long survived that of the heart. This organ was somewhat distended, the left auricle being loaded with blood, and the ventricle being also full and dark from the blood within it.

In six frogs, similarly treated, the auricles remained irritable under galvanic stimulus during periods which varied in the different cases from thirty minutes to five hours; while in other instances, and especially when the quantity inoculated was large, the heart refused to respond to galvanism so soon as its rhythmical action was at an end.

It will be seen from the cases here recorded that the heart usually ceased to pulsate before either nervous or muscular irritability was lost, and while the animal remained capable of all the usual voluntary motions. This is so remarkable in some instances that the frog was seen to seek a place of refuge, insinuating himself under the ledge of a test-tube rack, or hiding in the folds of a cloth left on the table.

The remaining observations upon the heart's action were made incidentally while studying the absorption of vao with reference to the various surfaces. Upon comparing these with the results last obtained, a very remarkable fact was observed with reference to the departure of irritability in the nerves and muscles, and the continuance of a pulse in the heart.

Since these experiments are stated more or less fully in the portion of this paper which treats of the absorption of vao, it is unnecessary to detail more than the facts which relate to the points in question.

In the cases alluded to, vao was administered to frogs by the skin, the stomach, the rectum, etc., as has already been described. Under these circumstances the phenomena moved more slowly, and death was postponed as late as twenty-four hours or more after the use of the poison. It was then observed that in some instances the heart still acted, though with great feebleness, after all movement had departed from the voluntary muscles. When it did stop, the irritability was very rapidly lost.

In warm-blooded animals the heart usually continued to beat for a short time after respiration had ceased. As usual, the ventricle stopped first, and the auricles next. In a cat the heart beat for fourteen minutes after respiration had been checked, and was irritable under galvanism for a few minutes longer; though in warm-blooded animals generally, who die of vao, this is not the case. In all of this class of hearts the organ presented the appearances commonly seen after death by asphyxia. It was also observed that the intestines were usually the seat of active peristaltic movements.

We could scarcely anticipate that the difference in the mode of introducing this poison into the system could so affect the after phenomena. It has indeed been noticed by others that convulsive motions are more common in animals poisoned by woorara when the poison is ingested than when it is inoculated, and this fact we have also verified; but that the action of the heart should be so differently affected by the two modes of administering the agent we have employed, was an unlooked-for result. It certainly ap-

pears from the experiments detailed, as well as from others which are not stated, that when vao is inoculated it checks the heart's action, and even in some cases annihilates its sensibility to direct stimulation, before the nerves and voluntary muscles have ceased to obey volition. On the other hand, when vao is absorbed from a cutaneous or a mucous surface, the phenomena march more slowly, and the frog is left a lifeless mass, to all appearance, his nerves deprived of responsive irritability, and his voluntary muscles only alive to the direct action of galvanic currents, while the heart is still beating, or is at least awake to the galvanic stimulus.

The mode in which the heart is arrested is worthy of note. In cold-blooded animals there is no primary stimulation of the heart. It beats progressively more slowly, until the ventricle acts only in parts of its bulk, and finally ceases to move. Next the auricles stop, the right pausing first. The manner in which the tissue of the heart behaves under the influence of corroval has been already described very fully. In fact, nothing can be more curious than the bulging out of the fibres of the ventricle in places. The same phenomenon occurs in poisoning by vao, though far less marked.

It now becomes important to ascertain the cause of this enfeeblement and arrest of the heart's action. After some thought, we have concluded that in this poison, as in the corroval, this arrest of movement is due to paralysis of the muscular fibres of the organ. This paralysis appears to be localized at first in spots here and there in the ventricle, and afterwards to become general. To it are due, we conceive, the curious projection of small portions of the ventricle when the poison is fully affecting the heart. That this is the cause of the phenomenon in question may be made clear by tying the aorta of a frog, when the same phenomena present themselves as the organ becomes paralyzed from the distension to which it is exposed. A very interesting demonstration of the cause of the local prominences which we have described as marking the action of these poisons on the central organ of circulation, may be obtained by galvanizing portions of the ventricle in a frog which has taken no vao. Wherever the current passes, there is seen at the next contraction of the ventricle a prominent red elevation. The galvanism seems to over-stimulate, and thus paralyze a portion of the tissue. The rest of the heart contracts as usual, and the weakened galvanized portions is filled full of blood, and puffed out above the level of the active surrounding tissues.[1]

[1] The phenomena here described are among the most curious and striking physiological facts which have come under our consideration. The appearance presented by the heart, either where vao or corroval has been used, or when alternating galvanic currents have affected its tissue, is not easily described, so as to give any clear idea of the extraordinary behaviour of the heart under these circumstances. When the current affects the whole ventricle, it becomes large, and ceases to beat. When a small portion of the ventricle is included in the circuit, this alone pauses, and at the next beat of the ventricle makes a hernia-like projection from the neighbouring tissues. The prominences so formed are of a deep red tint. At the next action of the heart they are less marked, and in each succeeding ventricular con-

Now, whether the paralysis of the heart is due to a direct effect upon its muscular tissues, or to a paralysis of the ganglia of the heart, is a question which can scarcely be solved without a previous determination of the exact cause of the heart's rhythmical action. Since, however, the muscles of the heart so soon cease to be galvanically irritable after they have ceased to move automatically, and since it can be shown that the muscles elsewhere lose irritability earlier than usual, it is probably a direct effect on the muscular fibre of the heart which causes its arrest. If, in fact, the loss of motion were due to a nerve paralysis, the muscular tissue ought to be long afterwards responsive to stimulus. Whereas this is not the case in corroval poisoning, and only so in vao poisoning to a less extent than is usual in cold-blooded animals. Judging from warm-blooded animals only, we should conclude that vao killed by asphyxiating the animal, and thus arresting the heart. Whereas it is most probable that it is the early enfeeblement of the circulation which gives rise to a co-ordinate arrest of those muscular and nervous functions which are essential to produce and sustain respiration.

We have, however, a better proof at hand to aid us in showing that the checked respiration is only a last link in the chain of causes which produce death. The frog will live for many hours without breathing otherwise than by the skin; yet if a frog be poisoned with vao, he dies, the heart is arrested, and certainly without asphyxia having taken place. Again, in the alligator, respiration by the lungs goes on quite actively some time after the heart has ceased to move, as we have already seen to be also the case with corroval.

Respiration.—In cold-blooded animals, as the frog, and where the poison acts rapidly, the respiratory motions of the jaw, and sometimes of the flank, not unfrequently continue after the heart's movements are at an end, but the efforts thus made do not fill the lung. When the frog is poisoned through the skin or mucous surfaces, the action of the heart long survives the respiratory motions.

The fact of the continuance of efforts to breathe after the heart has entirely stopped, has been already alluded to. In the various experiments upon the effect of vao on the other functions, will be found such record of the fact as renders it unnecessary to repeat here the statements of experiments already quoted.

Calorification.—We have not thought it requisite to examine the effect of corroval upon the temperature of animals poisoned by it, because it acts with so much rapidity that it is scarcely possible the animal could lose

traction they are less and less distinct, until only a slight flush marks the spot, and this also finally disappears. To prove conclusively that these effects are due to an over-stimulation, and a consequent temporary paralysis of the affected part, it is only requisite to over-stimulate, by mechanical means, a portion of the muscular fibres of the ventricle, when the same results occur to a more or less marked extent.

enough of heat to be appreciable, before the heart stopped. For similar reasons M. Bernard did not find any change of temperature in the animals poisoned with ordinary woorara.

In the volume so often quoted, he records a single experiment upon the temperature of animals killed by woorara, and seems to entertain no doubt as to the generality of the conclusion stated in that connection. He found that in warm-blooded animals the temperature did not fall before death. Not having a specimen of the woorara used in Europe, we are unable to verify this observation, which is doubtless correct as regards that variety of poison. In fact, it slays with such rapidity, and with so little primary effect upon the circulation, that a fall of temperature is scarcely to be anticipated where the dose is large and the death sudden. Whether any other result would occur if the amount given were so small as to insure a more lingering death, we are unable to say.

In animals poisoned by vao, the period of time which elapses between the administration of the poison and the entire cessation of movement in all the muscles except that of the heart is so considerable, that the failure of the respiratory acts is gradual. In such cases, therefore, the death is at least, in part, if not wholly, a death by asphyxia, as we have already shown; and hence a fall in temperature is naturally to be expected. The following experiments are sufficiently definite as to this point.

Expt. A gray rabbit received in the thigh a morsel of vao, at thirteen minutes after five.

Normal temperature of the rectum 101½° F. At the close of twenty-three minutes he began to chew, as though eating, gritting his teeth at intervals. His head fell forward now and then, as though he were drowsy, and was jerked up again with a quick movement, only to sink lower a moment afterwards. In twenty-eight minutes he fell on his right side, the heart beating more slowly. The eyelids next grew insensible to a touch, the pupils largely dilated, and slight convulsive motions of the ears and hind legs took place. Temperature of rectum, 97½° F. It continued to fall up to 6 P. M., when it was no longer observed. The heart was still acting at this time, beating about once in the minute.

Expt. A large and very vigorous rabbit was selected, and a thermometer oiled and introduced into the rectum, where the temperature stood at 104° F. Fifteen drops of a solution of vao in water, 3 grs. to ℥j, were then injected into the areolar tissues of the thigh, when the following series of observations were made:—

Time.	Rectal temp.	No. of respirations.	
7.20	104		
7.25	103¾	104.	The temperature with which the experiment began was unusually high for the rabbit, whose normal heat is from 101° to 102½°, or even 103° F. The rabbit had, however, struggled very violently, and hence, in all likelihood, the very elevated temperature first noted, and the consequent depression when he became entirely tranquil.

Time.	Rectal temp.	No. of respirations.	
7.30	103°	128	
7.40	102¾°		
7.43	102½	128.	Struggles.
7.45	102½	96.	Head drooping.
7.47	102¼		
7.50	102	100	

Time.	Rectal temp.	No. of respirations.	
7.52	102	96	
7.53	101¾	80	
7.55	101½	72.	Slight convulsion; eyelid irritable; pupil large; general movement of the skin muscles.
7.57	101¼	Irregular and rare.	
7.58	101		Respiration ceased; the skin muscles were still moving quite actively; the head fell; the pupils were dilated; the eyelid no longer irritable; the heart still beat feebly; at

Time.	Temp.	
8	100¾	
8.4	100¼.	Pupil contracting. At 8.8 he was opened, when the heart was found to be yet beating well though feebly. The heart was very irritable to mechanical stimulus. The muscles elsewhere responded to galvanism, but not at all to mechanical irritation. Up to 9 the temperature continued to fall, when the observation terminated.

Expt. A healthy pigeon, scantily fed, had at 1.56 P. M. a rectal temperature of 106° F., a morsel of vao being placed under the skin of his thigh. The following record of temperature was obtained:—

Time.	Temperature.	
1.56	106°	
1.58	105	
2.1	104½	
2.2	104¼	
2.4	104	
2.6	103¼	
2.8	103.	When her head drooped and fell; the eye closed, and respiration stopped.
2.14	102	
2.17	101	
2.21	100	
2.25	99	
2.29	98.	No rise of temperature was observed up to 3 P. M., when he was no longer observed.

If follows very plainly from these, and similar results which we do not think it requisite to quote, that the temperature of warm-blooded animals falls considerably before death occurs.

The Nervous and Muscular Systems.—The effect of vao upon the irritability of the nerves and of the voluntary muscles is best considered together, since, in the experiments upon this point, the condition of the nerves and muscles was recorded at the same time.

In this connection, it became necessary to determine, 1st. Whether the nervous irritability lasted as long as that of the voluntary muscles. 2d. Whether the poison affected the motor or sensory nerves first, or whether both were equally attacked at one and the same time. 3d. Whether, as in the poisoning by ordinary woorara, the irritability of the muscles remains for a greater length of time than it does after death by decapitation or otherwise.

Expt. A large frog received under the dorsal skin a morsel of vao. In forty minutes all volitional control had departed. The left sciatic nerve was then isolated, divided, and the ends put upon a piece of glass. When the central end was galvanized, slight twitches occurred in the other leg, showing that the power to carry impressions to the centres, *i. e.*, sensibility, was not extinct. On galvanizing the distal end of the nerve, the muscles to which it is distributed

contracted freely. Twenty minutes later both extremities of the nerve refused to obey the galvanic irritation, although the muscles were still excitable by direct irritation.

Expt. Four hours after a morsel of vao was placed under the skin of a frog he was motionless, and no reflex motions could be obtained, except in the eyelids. At this time the left sciatic nerve was cut across. Galvanic irritation of the digital end had no effect on the muscles, which, however, continued irritable when directly galvanized during seventeen and a half hours.

Expt. A frog was poisoned like the one last described. His heart ceased beating in thirty minutes, when the nerves were still irritable. Their vitality, however, rapidly diminished and was gone in two hours, the muscles remaining alive to galvanic irritants during fourteen hours only.

Expt. A frog received in his back a small piece of vao. In forty minutes the voluntary motions were lost, and feeble reflex actions could still be provoked by pinching the legs. The eye was still irritable. At this moment the right sciatic nerve was isolated and divided without causing muscular motions in the leg. On galvanizing the centrally connected end of the nerve, one slight movement took place in the other leg. Irritation of the digital end of the nerve produced slight twitches in the peroneal muscles. Thirty minutes later both ends of the nerve were no longer irritable. The heart and muscles were still contractile when galvanized, but not when mechanically stimulated. The left leg and the rest of the body of the frog were then carefully protected by damp cloths; a dead frog being laid upon the leg on which we had operated in order to guard it from the direct effects of the moisture. In despite of these precautions, the nervous and muscular irritability was totally extinct at the close of forty-eight hours.

Expt. A large frog received in the peritoneal cavity one drachm of the weak solution of vao, one grain to one ounce, his right femoral artery having been previously tied so as to prevent the poison from having access to the tissues of this limb. The right leg now moved with more difficulty than the left. One hour and twenty minutes after the poisoning both sciatic nerves were divided. On galvanizing them both, the muscles of the leg whose artery was tied moved freely—the nerve of the uninjured leg being galvanized, feeble motions occurred in the muscles. Half an hour later the nerve of the uninjured side lost the power to evolve movement in the muscles, while galvanic irritation of the leg whose artery was tied gave rise to free motion in its muscles. The part which was protected from the poison by having its artery tied, therefore retained the irritability of its motor nerves longer than the part which was exposed to the poison. On dividing the spinal column, half an hour later, in this frog, and thrusting a probe upwards, the eyes alone moved; when the probe was thrust downwards no motion resulted.

Expt. A large frog received in his back, under the skin, fifteen drops of a solution of vao, of the strength of five grains to one ounce of distilled water. At the close of three hours, the nerves of the leg were cut across and galvanized at the digital end, causing some movement in the muscles of the calf and foot. The muscular irritability was already enfeebled. An hour later the motor nerves had lost all irritability, while the muscles were so much enfeebled that they responded but slightly when directly galvanized. The muscles of the under jaw remained irritable longer than any others, and this is usually the case in poisoning by vao.

It becomes sufficiently clear from the foregoing experiments, that under the influence of vao, the irritability of the motor nerves in the frog is lost very early, and that the irritability of the muscles is also enfeebled and finally destroyed much sooner than is usual.

It is also clear that in frogs which are poisoned rapidly by a large dose of vao, the nerves of motion cease to functionate before the muscles are deprived of the power to respond to direct stimulus—another proof, if any

were needed, of the independence of the muscular irritability, and of its absolute want of connection with that of the nerves.

To make the matter more perfectly clear and definite, a number of comparative experiments were made.

Expt. A frog was poisoned with the vapour of ammonia. At the end of twenty-four hours none of his muscles were irritable. They were not examined earlier than this.

Expt. A frog killed with atropine retained his muscular irritability during twenty-seven hours and thirty minutes, when the observation terminated.

Expt. Of two frogs killed by decapitation, the muscles remained irritable in one during thirty-nine, and in the other during forty-eight hours.

Like results were obtained in all cases of death by decapitation. Now it is well worthy of remark that on comparing our own researches upon this special point with those of the French observers, it is seen that the normal irritability of the muscles is less persistent in our frogs than in those used by the *savans* in question. In many instances stated by Bernard and others, the muscular irritability of decapitated frogs lasted during five or six days, whereas in no case has it remained in our own frogs after fifty hours. The temperature is one of the most important factors in this very interesting problem. In warm weather the irritability departs very early, and unfortunately M. Bernard does not state the condition of the thermometer at the time he made his experiments. Our own researches were conducted in a room whose temperature ranged during the period of our examinations from 49° to 68° F.

The determination of the fact of the early loss of muscular irritability under the use of vao, separates it widely from ordinary woorara, which, according to M. Barnard, not only does not weaken the muscle, but actually prolongs very remarkably the period during which they may be made to respond to galvanic or other stimuli.

In no instance was it found that vao affected the movement of the cilia in the frog's throat.

Having thus determined that the functions of the nerves are destroyed before those of the muscles succumb, and also that the muscular irritability is weakened and finally annihilated long before the time when the same result is observed in many other modes of death, we have yet to consider the remaining questions as to the order of abolition of function in the two great classes of nerves, motor and sensor—and as to the influence of vao upon the brain and the sympathetic system.

The woorara of European observers, according to M. Bernard, acts first upon the motor or efferent nerves, and destroys all reflex acts very early, because the efferent nerve which is first paralyzed is essential to the production of these phenomena. A frog which has taken woorara is, therefore, physiologically in the same state as one which has had the motor roots of the spinal nerves cut across. To test this with vao poison—

Expt. A large frog was selected, and a ligature tied around the right femoral artery. The voluntary actions ceased very early. The legs were sensitive to

direct galvanic stimulus. Slight reflex movements occurred in the legs, and the eyelids winked when touched. When the belly or back was galvanized, the leg in which the artery was tied responded by reflex movements. The other leg did not stir. On isolating its nerve and galvanizing the distal end, its muscles moved, though feebly. The nerve of the other leg being similarly irritated, vivacious motions took place in its muscles. The poison had gone too far and acted too rapidly to make this a satisfactory experiment. It showed doubtfully that both orders of nerves were affected to some extent, and it also indicated the greater tenacity of life in the upper part of the body, where the eyelids continued irritable and where the muscles under the jaw responded when the motor manifestations were weak in all other parts of the body exposed to the action of the vao. At the close of an hour and a half the spine was destroyed, when the leg which had been operated upon moved slightly. No other motion resulted and the muscular irritability was extinct in five hours.

Expt. A large frog poisoned by vao was motionless in three hours, save that the eyelids still acted. His left femoral artery had been previously tied. The right sciatic nerve was exposed, divided, and the two ends insulated on glass. As the poison had been cut off from the left leg, it could not share in any supposed loss of motor power, should such exist. If motion was lost in the poisoned parts and sensation remained, an irritant applied to the centric end of a nerve in the poisoned part would convey the stimulant effect to the nerve centres of the spine, and the nerve of the unaffected limb ought to acknowledge the irritation by reflex acts. The irritation of the poisoned nerve would be felt by the nerve centres, but in case the motor functions of the poisoned parts were abolished, no muscular reflex act could result anywhere, save in the unpoisoned limb, whose nerve and muscles would, so to speak, translate into the language of motion the reflected impression. Such does occur with ordinary woorara. In the present instance neither the galvanization of the fore legs nor of the centric end of the right sciatic caused motion in the unpoisoned leg, which, however, moved vivaciously when directly stimulated. A probe thrust down the spine produced free motion in the leg the artery of which was tied, and some twitches in the other. The defect of reflex motion was, therefore, not due to want of life in the motor nerves or the spinal centres.

Expt. The sciatic nerve of the left leg of a frog was isolated, and a wire being passed beneath, it was carried around the rest of the limb and tightly twisted. Vao was then employed as usual. The right brachial nerve was galvanized after the reflex motions had become extinct to all appearance—slight movements took place in the leg of the same side, but no form of stimulus applied to either brachial nerve caused motion in the leg on which we had operated. The twitches above mentioned showed, however, that both motor and sensory power was feebly preserved even in the poisoned parts. A little later no such motions could be had, although the poisoned limbs still moved for a time when their nerves were directly stimulated.

Expt. A very large frog had his sacrum removed, so as to expose the lumbar nervous plexus. A ligature was cast about the rest of the body, excluding these nerve-trunks. As the ligature arrested the circulation, the bridge of nerves alone connected vitally the two segments of the frog. A solution of vao was now injected under the skin of the trunk, above the ligature. Two hours later, the reflex acts being at an end in the upper parts of the frog, the brachial nerves were irritated, but without evolving the slightest motion in the unpoisoned limbs. Direct stimulus applied to the lumbar plexus caused free movement in the legs.

In the next experiment the brain was removed before the frog was poisoned. His reflex motions were well developed, but faded rapidly. The nerves of the arms were galvanized, and by degrees lost the power to provoke motion elsewhere; while, at the same time, their muscles still moved when the distal end of the nerve was galvanized.

Expt. A large frog was chosen, and the heart exposed. A large amount—twenty drops—of a solution of vao, five grains to the ounce, was put under the skin of the back. In fifteen minutes the ventricle stopped, and the auricles also ceased beating in twenty-five minutes. Three hours after the poisoning one sciatic nerve was uncovered and galvanized by a powerful alternating current; the

muscles of the same leg responded freely. The nerve was then cut, and the centric end galvanized, without any reflex acts occurring. The lumbar nerves were next tested, but still with no result as to reflex motion elsewhere. Finally an examination of the nerves of the other limbs showed that their nerves still retained motor power, and that their muscles were sufficiently irritable.

It becomes very clear from these experiments, and others which we cannot afford space to quote, that vao acts first upon the sensitive nerves, and not, like other woorara, upon the motor filaments. Its next action is upon the motor function of the nerve-trunks, and lastly upon the independent irritability of the muscles.

In almost all of the experiments, although the fore legs were first affected in the paralysis which finally involved all parts, the respiratory muscles under the jaw and the muscles of the eyelids remained active long after all the rest, although so feeble that their efforts did not suffice to fill the lungs.

It has been shown conclusively, in the early portions of this paper, that the mere stoppage of the circulation by ligation of the vessels at the base of the heart produced a rapid and complete loss of nervous but not of muscular irritability. The paralysis of the nervous system, under the use of vao, is therefore due, in all probability, to the enfeeblement and final loss of cardiac power. The defect of muscular irritability must be a result of the poison acting on the tissue of the muscles themselves.

Effect of Vao on the Blood.—After repeated examinations of the blood of animals killed by this poison, we have been unable to trace the slightest alteration in the form of the blood-globule when the perfectly fresh blood was inspected. If it be allowed to stand some time, either within the animal or after removal from his vessels, the usual alterations in the form of the disks may be seen. One observer, at least, has conceived that ordinary woorara affected the forms of the blood-disks; but all subsequent investigations have been opposed to this view, and it is probable that his examination of the vital fluid was delayed so long as to permit of those osmatic changes in form to which the delicate red corpuscles are so familiarly liable.

We have also studied the blood with reference to the influence of vao on its coagulation, and on its power to absorb oxygen. Neither in frogs, in rabbits, nor in birds, has vao appeared to retard the coagulation of the blood. In one single case, that of a cat, was this act unusually delayed.

In the frog and the alligator the lung appears to supply sufficient red blood up to the last moment to redden the heart in one-half of its area until the ventricle ceases to move. Where, therefore, asphyxia is not an essential result, as in these cold-blooded animals, the heart is checked by the vao before any marked change has taken place in the colour of the blood. In warm-blooded animals—cats, rabbits, mice, birds, etc.—the final link in the chain of causes which produces death is asphyxia from want of muscular movement. Here the blood is black, and the heart presents the appearances commonly observed in asphyxiated animals. The power of this dark blood to reabsorb oxygen was ascertained in the following man-

ner: The blood of a large rabbit, poisoned with vao, was whipped as it escaped into a vessel, to free it from fibrin. Thus prepared, it was agitated in a bottle with atmospheric air, when it was soon observed to have recovered its bright arterial hue.

Before we call attention to the subject of the differences between corroval, woorara, and vao, it has occurred to us that it would be as well to state here the physiological evidence bearing upon the question of what it is that gives the deadly potency to corroval and vao. A portion of such evidence is to be found in the chemical and microscopical characters of these poisons, and we shall in this place insist alone upon certain interesting physiological facts. The old opinion as to the activity of woorara being due to the venom of poisonous serpents is still to some extent a popular belief. To examine this matter anew, with reference to the poisons before us—

Expt. A large frog was chosen, and a small scale of dried venom from the rattlesnake was placed under the skin of his back. This poisonous material is nearly two years old, and is in the form of dry yellow scales upon the side of a bottle. It was obtained by one of the authors of this paper (Dr. Hammond), by holding a snake with his upper jaw over the edge of the bottle, so that, on irritation, he discharged his poison into its interior.

During twenty-five minutes the frog, poisoned as described, was unusually active. At the close of this period he became more quiet, and occasional twitches were observed in the hind legs, which were also extended spasmodically at intervals. Ten minutes later he lay quiet as placed, in any position, breathing at intervals. The eyelids were irritable, and reflex motions could be provoked. All voluntary power seemed to have fled. One hour and ten minutes later the reflex motions still occurred when irritants were used, and the twitching and extension of the legs continued. He was now becoming rapidly enfeebled. Two hours and fifty minutes after the administration of the poison no motions could be evolved, and he was then laid open. On applying the galvanic current to the voluntary muscles no motion occurred, and the nerves were, of course, unable to produce any muscular response when galvanized. The heart was still beating.

A second experiment, of a similar nature, was made upon a large frog, with nearly similar results, except that death did not occur until five hours after the venom was used. It was noted in this case, as a curious fact, that the eyelids were insensible before the reflex movements of the extremities were lost. After all reflex motion had departed, the heart, which was large and almost black, continued to act during more than two hours in all of its cavities. During this time the nerves and muscles were more or less irritable when galvanized. The vitality of both nerves and muscles was lost within five hours after the heart had ceased to act.

These two cases differ from one another in certain particulars which demand the future criticism of experiment; but at present it is enough to point out the dark and swollen state of the heart, its long-continued and perfect action in all its parts, and the occurrence in both frogs of local spasms of the muscles, as well as occasional convulsive extensions of the hind legs, as marking a difference between the venom and both corroval and vao, which we hope to examine more fully at another time.

It might naturally be supposed that the local character of the wounds would also constitute a further ground of distinction. We were not astonished, however, to observe that the rattlesnake poison produced no local effect in the frog. The wound in which was placed vao, corroval, or the dried

venom of the *Crotalus confluentus* was not in any way to be distinguished by the eye. Meanwhile, it is to be observed that the animals used were cold-blooded reptiles, which are not capable of developing inflammatory action, such as is observed in the tissues of mammals similarly treated.

Again, it is worthy of note that the venom employed was two years old, and perfectly dry. How far this may have modified the result we are as yet unable to say. A pigeon, poisoned with the dried venom of the crotalus, died in two hours and fifty-two minutes. Two minutes after the wound was made in his thigh it had become black. Around this a ring of a deep amber colour was seen, and before death a dark serous fluid exuded from the wound. A simple wound made at the same time exhibited no such phenomena. Very little swelling occurred about the poisoned wound, and no general swelling of the body was observed. Soon after the inoculation was effected the pigeon rocked on his feet, staggered, fell, and rose again, flapping his wings and vomiting corn from the crop. A half hour later he gradually sank down, the breathing grew laboured and uneasy, and the heart beat rapidly. The temperature fell to 94° F. one hour and thirty-two minutes after the poisoning, and continued to fall, until, when it reached 88° F., death occurred, during general but not very violent convulsions. Rigor mortis came on within forty-two hours. On examination of the blood-globules, they presented no unusual or abnormal peculiarities. The local affection is in this warm-blooded bird the distinctive difference between the action of vao or corroval and that of the serpent poison. In both cases asphyxia is in warm-blooded animals the last link in the chain of causes which produce death.

It is, then, highly improbable that the venom of serpents is used in the manufacture of the poisons before us. As it is stated that ordinary woorara is formed from the juice of the *Strychnos toxifera*, and as the alliances of this plant would seem to make it probable that it contained strychnia, it became interesting to know whether that substance might not have been so altered by the long boiling required to prepare the woorara as to change its character and affect its toxicological peculiarities. Accordingly a grain of strychnia was boiled with gum starch and water for nine hours, without in the least impairing its peculiar qualities. A frog poisoned with the mixture died, tetanized as usual. We desired to ascertain, in the next place, whether, if our own vao poison contained strychnia, it would be so modified by the other constituents of the poison as to lose its peculiar powers. A minute portion of strychnia was therefore added to a little vao, and the two poisons inserted under the skin of a frog. He perished in tetanic spasms, and the heart stopped soon after death. The same effects were observed when corroval and strychnia were separately introduced under the skin in two distinct localities. Now, as the heart of the strychnized frog will beat for some hours after all externally visible motion has ceased, it is plain that in the double poisoning both agents produced their own distinct and pecu-

liar effects. The one caused tetanic spasms, the other paralyzed the heart. It is, therefore, sufficiently clear that no form or modification of strychnia is present in the vao or corroval.

In addition to the negative evidence here adduced, we have the more positive results which have been stated in connection with the physical and chemical examination of the two poisons. From the whole evidence, we feel authorized in considering both poisons as of vegetable origin.

The history of the antidotes to this poison may be very shortly summed up.

Sir Walter Raleigh, in his very curious account of the arrow-poison, tells us that the Spaniards were cured of ordinary poisoned wounds by the use of the juice of the garlike (garlic), in which, however, he reposes but little faith. His own remedy, a knowledge of which he professed to have obtained from the Indians, he thus describes: "But this is a general rule for all men that shall hereafter travell the Indies, where poisoned arrows are vsed, that they must abstaine from drinke, for if they take any licor into their body, as they shall be marvellously provoked thereunto by drought. I say if they drink before the wound be dressed, or soone vpon it, there is no way with them but present death."[1] The next allusion to antidotes is equally vague, and it is even doubtful whether the poison alluded to has any analogy to the woorara at present known, since it is said by the authority referred to, that it kills only after seven days. De la Vega further informs us that to arrive at a knowledge of the antidote, the Spaniards wounded an Indian with a poisoned arrow, and then setting him free, observed that he chose certain herbs, which he ate, and applied locally, with entire success.[2]

De la Condamine[3] is the first writer who speaks of sugar and salt as antidotes. After returning to Cayenne, he made a few experiments with woorara, thirteen months old. Of two chickens which were poisoned by woorara, and treated with sugar internally, one died. Afterwards, at Leyden, and before Mussenbreck, Van Swieten, and Albinus, the sugar antidote totally failed. Some of De la Condamine's woorara passed into the hands of M. Hérissant,[4] who used sugar and wine as antidotes in the case of a lad who had been left to watch some of the poison which was boiling in a small and close room. The boy became weak, and was supposed to have been a sufferer from the poisonous fumes. It is needless to add that in his case the sugar acted perfectly. Not so fortunate were ten birds which were poisoned by M. Hérissant, with a mixture of Lamas and Ticunas, and instantly fed upon sugar. Nine of them perished. Salt

[1] Sir W. Raleigh. Disc. of Guiana, p. 71.
[2] The Royal Commentaries of Peru. By the Inca Garcilasso de la Vega. London, 1688, p. 741.
[3] Tr. de l'Acad. des Sci., 1745, vol. lxii. p. 489.
[4] Phil. Trans., vol. xlvii. p. 75. 1746.

proved equally unsuccessful, whereas instant amputation, or the actual cautery, saved the life of the animal. A single experiment was made as to the value of the ligature as a safeguard. Although applied to the limb beforehand, it failed entirely. M. Hérissant also essayed the effect of large bleedings, after the poison had been given to horses. Of six so treated, two recovered.

Schomburgk,[1] whose work is of comparatively recently date, repeats the old story of sugar and salt as antidotes, adding, that the whites alone repose confidence in their protecting power. The Indians, who are said to place but little reliance upon any of the supposed antidotes, mention, as the best, cane-juice (sugar) alone or mixed with an infusion of the root of the wallabo (eperua or dimorpha).

Bancroft[2] relates that "the white inhabitants of Guiana consider sugar, *i. e.*, cane-juice, as a remedy in poisoning by the acawau, a variety of woorara. The Indians themselves do not acknowledge this property of the cane, and," he adds, "I have never been able, either by my own experiments or inquiries, to discover a single instance of its efficacy for that purpose.

With Fontana[3] began the closer examinations of this singular poison, which have made its modern physiological history a matter of such deep interest. This observer found that when the mineral acids were mingled with the Ticunas poison, it was rendered innocuous as an injection under the skin, or as a local application upon the bare muscles. The same result ensued when the acids were evaporated with the poison, and the residue was employed. Neither vinegar nor rum were of any avail as antidotes, when mixed with the Ticunas.

Osculati[4] also alludes to the antidotes, and states that a mixture of salt and sugar acts as such when taken freely, but that it is also essential to place in the wound a weapon dipped in this mixture, and to continue taking the not very agreeable compound of dissolved salt and sugar for some time afterwards. This statement is mere hearsay, and rests upon no experiments by the author of the paper in question.

The experiments of Drs. Brainard and Green, first in Chicago, and afterwards in Paris,[5] lead these gentlemen to consider the mixture of iodide of potassium and iodine as an antidote, when mingled with the poison in solution. These experiments are quoted and commented upon by Dr. Green himself, in a paper on woorara, which he has written since the date of the communication to the Academy, of his own results, and those of Dr. Brainard.[6] The last named researches shortly afterwards elicited from M. Reynoso an admirable paper[7] upon the use of various agents as antidotes

[1] Schomburgk, 1847.
[2] Bancroft, p. 297.
[3] Fontana, vol. xi. p. 118. 1781.
[4] Osculati, p. 201. 1850.
[5] Comptes Rendus de l'Acad., vol. xxxviii. p. 411. 1854.
[6] Am. Med. Gaz., vol. vii., Nos. 5 and 7; vol. vii., No. 1; 1855–6.
[7] Reynoso. Comptes Rendus de l'Acad., vol. xxxix. p. 68. 1854.

to woorara. In reviewing the essay of Drs. Brainard and Green, he classes as a caustic the iodine solutions employed by these gentlemen. He, therefore, attempted to render the iodine harmless to the tissues, while securing its primitive action upon the woorara. Having found that iodide of potassium used alone with woorara solution, did not prevent, but merely delayed its ultimate manifestations, he made the following experiments :—

Half a gramme of iodide of potassium, and 0.4 gramme of iodine, with 0.06 gramme of curare in solution were treated with hyposulphite of soda, drop by drop, until the iodine disappeared, when the mixture was rendered alkaline by the addition of carbonate of soda. This mixture killed in twenty minutes, when injected under the skin. A mixture of alcohol, iodine and curare did not prove fatal; but when, in such a mixture, the iodine was rendered inactive, by the use of the hyposulphite of soda, poisoning followed its use, in one hour and forty minutes. M. Reynoso thence concludes that iodine alters the poison, but does not destroy it. Hypochlorite of lime also delayed the action of the woorara. Experiments were further instituted, which seem to show that chlorine in a nascent or free state, destroys the poison. Chloride of sodium mingled with it did not save the animals tested with this mixture.

In another series of experiments, the author added 10 gtt. of bromine to 0.06 gramme woorara, and 7 cubic centimetres of water. This mixture was rendered fully alkaline by carbonate of soda and some few drops of hyposulphite of soda were added. It was injected into the subcuticular tissues of an animal, who died in 24 hours, in collapse, poisoned by the bromide of sodium, which, used alone, was found to be fatal in a like dose. When a mixture of woorara and bromine was heated until the bromine escaped, the residue was harmless when injected into animal tissues.

Sulphuric and nitric acids, caustic potash, lime-water, and ammonia-water, all retarded the action of woorara when mixed with it. Certain salts which are not caustic, such as the iodide and bromide of sodium, and iodide of potassium, also exercise a retarding influence; but this effect M. Reynoso looks upon as undoubtedly local, since iodide of potassium, given internally, does not prevent the poison from proving active when afterwards used subcutaneously. Both Messrs. Brainard and Green, and M. Reynoso are of opinion that the application of the cupping-glass, so long as it is kept applied, prevents the poison from being absorbed.

Notwithstanding the ingenuity of M. Reynoso's experiments, they do not entirely settle the question of antidotes to woorara, and while the action of certain salts in delaying the absorption, or the after-action of the poison, is distinctly made out, we are still left in the dark as to the cause of this effect from the use of an agent so harmless as iodide of potassium. Even upon M. Reynoso's showing, the solution of iodized iodide of potassium used by the American experimenters would have the double advantage of a cauterizing and a delaying agency when used with the poison, or put instantly upon the wound.

With woorara, as in many other kinds of poisoning, artificial respiration maintained for a length of time, saved the animal, when the dose of the poison was not overwhelming. Waterton's experiments on this subject are very striking, and are the last to which we shall refer, since the very recent writers, as Kölliker and Bernard, have merely quoted their facts from M. Reynoso's paper, which we have already analyzed. It is unnecessary to quote here the simple experiments which satisfied us that neither

sugar nor salt has any claims to be regarded as antidotes. Since, however, Brodie, Waterton and others had previously found, that by sustaining artificial respiration, time was allowed for the elimination of the woorara, and the animal escaped death, we resorted to the same expedient in rabbits and cats poisoned by corroval and vao. In no instance was the death even so much as retarded, and the heart ceased to beat as soon as usual. This result could have been anticipated, from the fact that in the alligator thus poisoned, respiration continued perfect long after all cardiac movement had departed. In one sense, therefore, corroval and vao are more deadly agents of destruction than common woorara, since, for them, no physiological antidote of any kind exists, while in poisoning by woorara, at least one resource is available.

Conclusions.—1. Vao, either in a solid, or more quickly in a liquid form, can be absorbed from the areolar tissues of cold-blooded animals as the frog.

2. It is also absorbed by the stomach, œsophageal mucous membrane, rectum, and skin, with a degree of rapidity which varies, and is rapid or slow as the animal is ill or well supplied with water.

3. Warm-blooded animals absorb vao from the stomach and intestine when they are fasting, but suffer no ill effects when the vao is given during digestion. That this protection is not due to a mere mixture of the vao with the food of the full stomach, is shown by the fact that rabbits, whose stomachs are always more or less distended with food, are protected only when owing to the entry of fresh food, digestion becomes active.

4. The demands of the system for water do not affect to any perceptible extent the absorption of vao from the stomach of the rabbit.

5. The circulation of the frog is arrested within from ten minutes to one hour by the introduction of vao under the skin. The same result obtains within from twenty-four to forty-eight hours, when the poison is swallowed in small doses.

6. The first effect of vao is to increase the force of the heart without increasing the number of its pulsations.

The next effect is a paralysis of the muscular tissues of the heart, so that the ventricle stops first and the right and left auricles next, in the order in which they are named. In a majority of the frogs poisoned by vao, the heart remained galvanically irritable for a certain time after the organ had ceased to pulsate.

The heart stops before the voluntary motions are at an end, in all cases of rapid poisoning. When poisoning occurs by absorption from a mucous surface, the phenomena march more slowly, and voluntary control and reflex power are sometimes lost before the heart has entirely ceased to beat.

7. Vao stops the respiration in warm-blooded animals by arresting the circulation, and so paralyzing the nervous system, without which respira-

tion is impossible, so that the checked respiration is a consequence and not a cause of the injury to the cardiac functions.

In the batrachia also, the respiratory movements cease before the heart has entirely lost the power to pulsate.

In the alligator poisoned by vao the respiration is perfect some time after the heart is at rest.

8. The facts last quoted and the inability of artificial respiration to restore or sustain the cardiac movements in warm-blooded animals poisoned by vao, proves sufficiently that the first effect of the poison is upon the heart, and that the appearances of asphyxia observed post-mortem in rabbits, cats, etc., are of secondary importance so far as concerns the cause of death.

9. The temperature of warm-blooded animals poisoned by vao falls with considerable rapidity, and does not undergo any elevation after death.

10. The nerves of sensation first lose their power to convey impressions—the motor nerves are next affected. The paralysis of the nerves extends from the periphery to the centre. The affection of the nervous system may be due to the sudden arrest of the circulation, and not of necessity to the direct influence of the vao. The irritability of the voluntary muscles in the frog is lost much earlier than is the case when the animal dies by decapitation.

11. The sympathetic nerve is paralyzed, at least in the upper portion of its distribution, before the nerves elsewhere have lost their functional power.

12. The ciliary motion is unaffected by the use of vao.

13. The blood of animals thus poisoned coagulated as usual, and had not lost the power of changing colour when exposed to oxygen or carbonic acid.

14. So far as we are aware, no true physiological antidote exists for vao poison, since even artificial respiration fails to sustain life in animals affected by it.

15. The vao poison closely resembles corroval in its physical, chemical, and physiological reactions. The alkaloids extracted from the two poisons produce in animals of equal size effects which cannot be distinguished.

We, therefore, are inclined to consider vao as merely a weaker variety of corroval, and to conclude that the apparent difference in the effects produced by the original extracts is due to a difference in their strength.

We have thus brought to a close an investigation which has involved considerable labour, and we now submit our results for the consideration of the Department. No statement has been made in this essay, and no conclusion deduced, of the accuracy or truth of which we at least are not fully satisfied. How far this may be the case with others we cannot say; and, at all events, whatever be the fate of these researches, we shall at least have had the pleasure of the pursuit, and the satisfaction of stimulating

inquiry upon questions of interest and importance. With the words of the venerable Abbé Fontana, whose labours in the field of biological investigation have been too much neglected, we would say, in conclusion, "Those only who observe and experiment make mistakes, those only who do neither, never err."

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ART. II.—*Report of Cases in which Metallic Sutures were employed.* By H. LENOX HODGE, M. D., Resident Physician in the Pennsylvania Hospital.

THE following cases seem worthy of being placed on record, both on account of the interest now felt in the subject of metallic sutures, and the advantages which I have seen result from their application. I shall relate the cases in the order in which they occurred.

CASE I. *Incised Wound of Hand. Sutures of Annealed Iron Wire.*—Philip O'Donnell, æt. 18, came to the hospital, February 13, with an incised wound, two inches in length, on the back of the left hand. It was made, he said, by a knife, about an hour previously. The wound gaped widely, and the sheaths of the extensor tendons were exposed, but not opened. The whole hand was hot, and the back of it quite red. There was a little hemorrhage, which stopped entirely upon the edges being approximated, and held in contact by three sutures of fine annealed iron wire. The wire did not follow the needle well; for, pliable as it is, it could not be accurately and closely bent over the eye of the needle. The interrupted suture was used, the ends of the wire being twisted together. The next morning the edges were agglutinated throughout the whole extent of the wound; but the hand was swollen and painful, and on each side of the wound, at the orifice made by each suture, lay a drop of pus. I removed the sutures at once. This caused some pain, because of the roughness of the wire when cut, and the rectangular shape of the suture. Under appropriate measures, the inflammation quickly disappeared. Then, by means of adhesive plasters and bandages, the fingers were kept in a state of extreme extension, and the wound readily closed. He was discharged well, February 24.

CASE II. *Chronic Ulcer. Sutures of Lead Wire. A Suture of Silver Wire.*—Henry Pool, æt. 22, had been suffering for many months from an indolent ulcer on the foot, after frost-bite. Under various applications it slowly healed, until it was about the size of the end of one's finger. Here it remained stationary for a long while, uninfluenced by any application. On Thursday, February 24, I cauterized the edges with nitrate of silver, and attempted to bring them in contact by means of two interrupted sutures of fine lead wire. I succeeded as regards the lower half of the ulcer; but above, the edges would not quite touch. The lead wire followed the ordinary needle readily, was perfectly pliable, and could be cut with the greatest facility by the smallest dressing scissors.

25*th*. The sutures have not caused the slightest soreness, nor inconvenience of any kind. He broke the upper one, by rubbing it this morning. I reapplied it as before. I allowed the sutures to remain until the eighth day, without the parts being apparently conscious of their presence, then removed them both, without giving the slightest pain, and found the lower half of the ulcer cicatrized, the upper half nearly as before. I again cauterized the edges with the nitrate of silver, and this time made them meet by means of a suture of fine silver wire. I used the silver wire because,

being stronger, it could be drawn tighter than the lead, without breaking it; and because I wished to observe its effect upon the same tissues. It caused no irritation whatever; but on account of the strain upon it, was gradually cutting out; so that on the third day, being quite loose, I removed it. The ulcer was still about half its size; and, under several applications, it slowly improved.

CASE III. *Amputation of Finger by Teale's Long and Short Rectangular Flap Operation. Lead Sutures.*—William Thompson, æt. 14, has been suffering for several weeks, from onychia in the distal phalanx of the third finger of his left hand. The finger is much congested and swollen, the nail is gone, the bone is bare, and in many points deeply ulcerated.

March 11. I removed the distal phalanx, by Teale's[1] operation, and made, in this instance, the long rectangular flap, from the palmar surface, and the short rectangular flap from the dorsum of the finger. The flaps were brought together by three lead sutures (two above and one at the side), and some strips of adhesive plaster. In three or four days the flaps had united, and the suture on the side being loose and now useless, was removed. There was no sign of inflammation around any of the sutures; but at the corner of the wound, where two ligatures of silk lay, there was a slight ulceration. I left the remaining sutures until the 18th; during this week they did not cause the slightest apparent irritation. On the 23d, the cicatrization was complete in every part, and the boy was discharged.

CASE IV. *Resection of Phalanx. Lead Sutures.*—Joseph Barr, æt. 14, had the fore finger of his left hand nearly severed this morning (March 16), through the second phalanx, by a circular saw. The bone was completely divided, and slightly splintered. The arteries appeared to have escaped uninjured. I attempted to save the finger, by resection of the ends of the bone, and removed about a quarter of an inch from one end, and a little less from the other; then cut off the lacerated portion from the edges of the wound, and applied three lead sutures; placed the hand on a palm-splint, and covered it with lead-water and laudanum. On the second day the suture on the outer side, where the parts had been most lacerated, had cut out, and was therefore removed. On the fifth day I removed a second suture, and found the edges had united on the upper and inner surfaces. The other suture I allowed to remain until the thirteenth day, and could detect no irritation resulting from its presence. In this case I noticed (and have since seen it repeatedly), a black glistening deposit near the sutures each morning. This I suppose to be a hydrosulphate of lead; it causes no inconvenience, and is very readily washed off.

April 7. The boy being tired of being away from home so long, was by request discharged. There still remained one or two fistulous orifices.

I have since heard from the boy, though I could not succeed in seeing him. He was at work, his aunt told me, with a useful finger, being able to pick up a needle with it; but the sore had not quite closed yet.

CASE V. *Amputation of Finger by Anterior and Posterior Flaps. Lead Sutures.*—William Selkirk, æt. 15, had the end of the second finger of his left hand crushed by machinery, on the afternoon of March 16. I amputated by the anterior and posterior flap operation, dividing the bone

[1] On Amputations by a Long and a Short Rectangular Flap, by Thos. P. Teale, F. R. C. S., London, 1858.

at the middle of the second phalanx, and brought the flaps together by three lead sutures.

19*th*. Finger much swollen, and painful. I removed the sutures and found the edges of the wound united throughout. The finger continued to swell; inflammation extended to the hand, and pus forming in the sheaths of the flexor tendon, necessitated a deep incision along the finger, after which the parts slowly recovered themselves. He was discharged well, April 11.

CASE VI. *Contused Wounds around the Eye. Lead Suture.*—Cordelia Reynolds, æt. 31, having been struck by a boot, was admitted to the hospital, with a contused wound about one inch in length, over the left eyebrow, and another contused wound, about half an inch in length, at the inner corner of the lower lid of the left eye. In each I used a lead suture to bring the edges in contact. On the fourth day the sutures were removed, and the wounds were well.

CASE VII. *Gunshot Wound. Lead Suture to a part of the Wound.*—Frederick Perkins, æt. 22, received a gunshot wound of his left hand, from the explosion of a pistol. Much of the palmar surface of the fore-finger was torn away, and the flexor tendons exposed; and extending from below, half-way across the back of the finger, was a clean cut, almost like an incised wound. The edges of this part of the wound I kept in apposition by a lead suture, and exposed it to a considerable strain, by bending the finger over the block of a Bond's splint, for the greater comfort of the patient, and for maintaining the flexed position in case of anchylosis. On the fifth day the suture, which was still tight, was removed, and this portion of the wound was found to be healed. The rest of the wound in several weeks closed by granulation.

CASE VIII. *Incised Wound of Neck. Lead Sutures.*—Henry Hamilton, æt. 32, attempted to commit suicide, while drunk, by cutting his throat with a shoemaker's knife. He inflicted on himself, a little to the left of the thyroid cartilage, a wound of about an inch and a half in length, through the skin and fascia merely. The wound bled freely, and gaped widely. Two silk ligatures and three lead sutures were applied. On the third day erysipelas began. Ligatures and sutures were at once removed. In a few days the erysipelas disappeared. He was perfectly drunk when brought to the hospital, had been in the habit of drinking to excess, and while here had an attack of mania-à-potu. The wound healed by granulation, and during the third week he was discharged, well.

CASE IX. *Amputation of Finger by Palmar Flap. Lead Sutures.*—Ellen Fitzpatrick, æt. 18, has been suffering from onychia for several weeks. Last year one of her fingers was amputated by Dr. Neill for the same disease. The finger now affected is so much injured as to require amputation at the junction of the second and proximal phalanges. The operation was performed by Dr. Neill, April 2, by making the flap chiefly of the palmar surface. The flap was much thickened, and not at all pliable, and thus caused a great deal of strain upon the three lead sutures I introduced. On the fourth day one suture had cut out, and was removed; the other two I took away on the sixth day; and the union was complete, except just at the edges. The parts soon contracted with the assistance of strips of adhesive

plaster, and on the 13th the line of cicatrization was complete. She was discharged on April 14, perfectly well.

CASE X. *Lacerated Wounds of Ear. Lead Sutures.*—John Foley, æt. 50, was brought to the hospital on Monday night, April 4. He had fallen down a flight of stairs, and struck his head against a marble table. Upon examination, we found that he had received a fracture (a simple fissure) in the mastoid portion of the right temporal bone, and several bad lacerated wounds of the right ear. The upper part of the ear was torn into three strips, attached only at the anterior edge. I brought the parts into their natural position, and retained them by lead sutures. The side of the head was then covered with lead-water and laudanum. The tissues were very much contused, and the man was an habitual drunkard.

6*th*. The wounds look very well, and in most places have united by primary adhesion; a little tongue of skin, however, which was almost torn off, looks as if it would slough.

On the fourth day an attack of meningitis began, which in a few days lost its violence, and gradually disappeared. But erysipelas, beginning with the ear, spread over his whole face to the other ear, and caused so much constitutional depression, with what he had already undergone, that he died April 19, while the local symptoms were abating.

The sutures were removed early, though I cannot name the day. The tongue of skin, mentioned above, sloughed. The wounds remained united, except at their outer corners, where they reopened during the attack of erysipelas.

CASE XI. *Amputation of Finger by Lateral Flaps. Lead Sutures. Lead Wire as a Drain.*—John Sheeren, æt. 27, came to the hospital April 7, with his finger so crushed by machinery as to need amputation at the metacarpo-phalangeal articulation. I performed the lateral flap operation, used three lead sutures; and twisting several pieces of lead wire together, placed it at the bottom of the wound, and brought the ends out at the upper and lower corners, so as to insure an exit for any matter that might form. I substituted this wire for the lint so often used because the latter absorbs so much pus as to become itself offensive before it is advisable to remove it.

16*th*. Took away the sutures, one of which had cut out. The edges had united, except at the upper and lower corners, where the lead wire, which I removed a day or two ago, had been placed. During the first four days he suffered a great deal of pain, and a slight discharge issued from the upper orifice, which continued until the 26th. He was discharged, well, April 28.

CASE XII. *Amputation of Toe. Lead Sutures.*—Charles Bradshaw, æt. 24, has had the inter-phalangeal joint of the great toe inflamed, with an external opening, for many weeks. It has resisted all means of cure.

April 9. Dr. Neill amputated through the articulation between the proximal and distal phalanges, by lateral flaps. I brought the flaps together by lead sutures. Union, except at the lower corner, took place before the fourth day. A slight discharge appeared daily at this point for nearly three weeks, when it closed.

CASE XIII. *Excision of Supernumerary Toes. Silver Sutures.*—Henry Gnade, æt. 5, has on each foot a double great toe, and a web be-

tween the second and third toes. His second and third fingers were also webbed, but were operated upon successfully when he was very young.

April 16. Dr. Neill excised the inner half of each great toe. On the right foot it was removed at the articulation between the proximal and distal phalanges. The distal phalanx alone was doubled. On the left foot, however, it was removed at the articulation with the metacarpus, as both the distal and proximal phalanges were doubled. Dr. Neill brought the edges of the wound together, and kept them in contact by the interrupted suture of silver wire. The sutures gradually cut the tissues, so that by the fourth day they were all loose, without union having occurred. The wounds granulated; the right toe was well in three weeks, and the left toe healed, except at one point, close to the metacarpo-phalangeal articulation, where there is still a slight discharge of pus.

CASE XIV. *Excision of Breast. Silver Sutures.*—Charlotte Johnson, æt. 57, had her right breast excised by Dr. Neill, April 23, for carcinoma. The incision was oblique, in the course of the fibres of the great pectoral muscle, and about six inches in length. Dr. Neill applied four silver sutures and adhesive strips to the wound.

26*th.* The posterior suture has torn out, and there the wound gapes to the extent of an inch. The rest of the wound looks well. Sutures still hold well, though each of them has cut a little.

29*th.* Removed the sutures. The anterior three-fourths of the wound have united, except where the ligatures passed out. The posterior part gapes widely.

May 21. The posterior fourth is now also almost closed by granulation. There is a slight discharge from the fistulous orifice left by the ligatures.

CASE XV. *Amputation of Finger. Lead Sutures.*—Bernard Branon, æt. 18, came to the hospital 4th mo. 24, after having his thumb cut off, through the proximal phalanx, by a hay-cutting machine. The flaps seemed good, but the bone was too long to be covered by them; so I made an incision on the side of the thumb, dissected up the flaps, and removed an additional piece of the bone. In this case the lead wire was passed through the flaps far from the edges, so as to insure their contact high up, and avoid any unnecessary strain on tissues that must have been more or less contused. I also made lead wire serve as a drain. The sutures were removed on the sixth day, when union was firm at the bottom of the wound. A narrow strip of skin came away. He was discharged, well, May 13.

CASE XVI. *Lacerated Wound of Nose. Lead Sutures.*—Thomas Sheeren, æt. 52, came to the hospital May 4. A man had bitten a piece out of his nose, and left a space as large as a five-cent piece in the right ala.

I cleansed the wound, drew the skin and muscles of the right side towards the median line, and retained them there by means of strips of gauze and collodion, and brought the edges into contact by two lead sutures, passing the wire double.

6*th.* The edges have remained in apposition. The parts are covered by a scab.

7*th.* The lower suture is loose; removed it. The wound has united, except just at the surface. Applied an additional strip of gauze.

10*th.* Removed the dressings. The upper suture had torn out. The sides of the wound remain together; the union below is firm throughout;

the surface gapes a little. Under strips of adhesive plaster and blue wash the wound contracted daily.

16*th*. Discharged, with merely a linear scar.

As will be noticed, the annealed iron wire was employed as a suture in but one case. In that it caused suppuration—apparently, at least. That it would not do so in every case, I am willing to believe, from its employment by Dr. Simpson, Mr. Spencer Wells, and others, in the radical cure of hydrocele. But I did not try it again, because it is more difficult and painful to introduce, cut, and withdraw than either silk, silver, or lead. The silver wire I have used in three cases, and seen used in others; and would fully agree with its advocates in laying aside the silk suture and employing it entirely, did I not believe that lead will answer our purposes still more efficiently and cheaply.

The superiority of the inorganic over the organic suture has, in effect, long been conceded, by its employment in certain difficult operations[1] (at the recommendation of Purmann, in wounds of the tongue; of Dieffenbach, in staphyloraphy; of Gosset, Sims, and Bozeman, in vesico-vaginal fistula; of Mettauer, in lacerations of the perineum and rectum), as well as by the length of time that it was allowed to remain. Gosset allowed his gold wire to remain twenty-one days, Sims[2] and Bozeman[3] always at least eight or nine days, and Mettauer[4] left his lead wire, in one case at least, for six weeks. Silk sutures, left in the tissues beyond forty-eight hours, become, in fact, setons. That metallic sutures are borne with perfect tolerance, any one will be willing to admit after his first experiment with either silver or lead wire. If they are drawn very tight, or if there is much contusion, they, of course, may tear out. In such cases, or where the parts are in constant motion, and indeed under many other circumstances, the clamps of Sims, or the buttons of Bozeman, or the old quilled suture, are very useful. The last I used a week ago, in a case in which I excised the proximal phalanx and part of the second for diseased bone; an operation which Dr. Dudley, of Kentucky,[5] Prof. Langenbeck, of Germany,[6] and Dr. Toland, of California,[7] recommend instead of amputation, as they state that the bone is reproduced. I made use of lead wire in place of the quill; and it has the advantage of being pliable, and capable of being moulded to suit any part. The sutures have now remained in for a little more than a week, and lie so easily as to seem to constitute almost a part of the finger.

[1] For a full history of metallic sutures, and their practical application, see *Med. Times and Gazette*, June, 1858; also *Medical News and Library* for Aug. and Sept. 1858, pp. 118 and 134. On the Use of Metallic Sutures and Ligatures in Surgical Wounds and Operations, by J. Y. Simpson, M. D.

[2] Silver Sutures in Surgery, by J. Marion Sims, M. D., New York, 1858.

[3] North American Medico-Chirurgical Review, 1857, vol. i. pp. 576, 885.

[4] American Journal of Medical Sciences for 1833, vol. xiii. p. 113.

[5] Transactions of the American Medical Association, vol. iii. p. 352.

[6] Guthrie's Commentaries on Surgery, London, 1853, p. 131.

[7] Reproductions of Bones and Joints, by H. H. Toland, M. D.—*Charleston Medical Journal*, November, 1857.

There is a choice, also, I think, between the inorganic sutures, the tissues seem to bear the pressure of different metals differently, and none so well as lead. But even if silver and lead are equally good in this respect, still lead is more easily cut, is more pliable, is cheaper, and at least becomes no blacker on exposure.

ART. III.—*Surgical Cases.* By R. A. KINLOCH, M. D., Surgeon of the Roper Hospital, Charleston, S. C.

CASE I. *Rare Form of Fracture of the Lower Jaw successfully treated by Suture of the Fragments.*—O'Ruke, aged 50, of feeble body, and with health much impaired by various excesses, was admitted into the hospital, partially intoxicated, on the 28th of June, 1858. An examination disclosed a compound fracture of the jaw, on the right side, just in front of the anterior border of the masseter muscle. All the molar teeth were absent, as a result of age, and the alveolar process of the bone about the seat of injury had undergone absorption. The soft parts covering the bone within the mouth were severely lacerated, and the fragments could be readily felt and seen through the wound. *The line of fracture divided the bone obliquely through its thickness, the obliquity being at the expense of the external plate of the small or posterior fragment, and of the internal plate of the large or anterior fragment.* The displacement was singular and marked. The small fragment projected inwards and slightly upwards into the cavity of the mouth; the large fragment rode the small one, having retreated downwards and backwards, and its extremity, which was somewhat pointed, could be felt externally under the integument. The patient's mouth remained partially open, and his chin had retreated so much backwards that the first glance suggested its disconnection from the lateral portions of the bone by a double fracture. There had been considerable hemorrhage from the wound of the soft parts, and from rupture, no doubt, of the inferior maxillary artery. A circumscribed portion of the lower lip, near the angle of the mouth, on the injured side, was destitute of sensibility. The patient's pulse was 120 per minute, small, and compressible; his nervous system was quite irritable, and he seemed upon the verge of delirium tremens; he could give no account of the cause of the fracture, as he was intoxicated at the time of the accident. The displacement was corrected, a compress applied under the chin and over the sides of the face, and secured by the figure of eight bandage of the head and jaw. (Barton's bandage, in which there are additional turns over the front of the chin, was contraindicated on account of the riding of the fragments.) It was believed that this apparatus could succeed only partially in preventing a redisplacement, but I concluded to be satisfied with this result for the time. The following treatment was prescribed: ℞.—Whiskey ℥jss; three times a day. ℞.—Tinct. opii ℥j; to be taken at bedtime. Diet, milk and beef-soup *ad libitum.*

July 1. It was evident that some more efficient contrivance for maintaining apposition of the fragments should be resorted to, as the displacement was as marked as on the first day. I accordingly put the fragments together, and secured the large or anterior one by connecting the upper and

lower canine teeth on each side with strong flax threads. (Thread was used as there was no wire at hand.) The small fragment could not be fixed in a similar manner, as the molar teeth were deficient. The compress and bandage were reapplied.

7*th*. Last contrivance does not appear satisfactory. Threads have yielded some, and bandage is deranged. Displacement, with riding, still marked. Extremities of fragments examined, and some partially detached splinters discovered, which promise soon to exfoliate. I now decided that suture of the fragments could alone preserve proper apposition; but as some exfoliation was certain, it seemed proper to temporize still longer. I substituted silver wires for the threads, connected the teeth as before, and, instead of the bandage, used a broad strip of adhesive plaster, carrying it under the chin, over the compress, and across the top of the head.

22*d*. Since the date of last note patient has been doing better. The large fragment has been kept in very good position. The adhesive plaster has now, however, yielded, and requires readjustment. Patient complains of "sharp point of bone cutting his gum," and also of the "wires paining and loosening his teeth." I removed the entire apparatus, and took away two detached spiculæ of bone. Silver wires were then twisted around the canine and the adjacent incisor teeth, both upper and lower, the extremities of each ligature passed through perforations in a leaden splint, and secured by twisting their ends together, so that the splint was held against the front of the teeth, and the upper and lower dental arches kept in contact. I hoped in this way to keep the large fragment more securely fixed than by the ordinary method of using the wire. The compress and adhesive strip were reapplied as before.

August 21. Up to this time the contrivance last described had been persisted in, and only removed on two occasions to take away spiculæ of bone detected and complained of by patient. A mouth-wash of Labarr. sol. chlor. sodæ and tinct. myrrh had been in daily use. A careful examination of the state of the parts was now made. The wound in the mouth had healed, and the soft parts consolidated about the seat of fracture; but, upon manipulation, the large fragment passed readily backwards and forwards over the small one; the peculiar deformity appears little changed. I again reapplied the compress and adhesive plaster, but determined to suture the fragments at the expiration of eight or ten days, should no more favourable result be promised.

30*th*. No improvement being manifest, I chloroformed the patient, and operated as follows: A semilunar incision, about two inches long, was made upon the side of the face, over the site of fracture, the middle of the incision reaching under the base of the jaw. The facial artery was necessarily divided in pursuing the dissection so as to expose the bone. With Brainard's smallest sized drill a perforation was made through each fragment, the drill being entered on the outside, close to the base of the bone, and about an eighth of an inch from the rough extremity of either fragment, and made to traverse the bony tissue and the mucous membrane covering it within the buccal cavity. During the boring the index finger of the left hand was kept within the mouth, to steady each fragment separately, and to protect the tongue from the point of the instrument as it entered the cavity. The drill was afterwards thrust between the fragments, and turned about, so as to lacerate slightly the intermediate connecting tissue. A stout silver wire was then passed through the perforations in the bone, from without inwards through the posterior fragment, and in the contrary direction through the anterior

one; the ends of the suture were tightly twisted together, so as to bring the fragments into secure apposition; and, lastly, the wound of the soft parts was closed by silver wire sutures, the extremities of the large suture that passed through the bone being brought out at one of the corners, and the compress and bandage once more adjusted. Patient went to bed and took an anodyne.

September 2. Sutures of soft parts removed; perfect union by first intention, except at corner where large wire passed out; compress and bandage reapplied.

26*th*. The suture of the bone had never given any trouble, and occasioned very little purulent discharge. Good consolidation is established. I removed the suture by untwisting it and pulling the ends carefully through each fragment. Compress and bandage still kept on.

October 7. All apparatus dispensed with; fistulous opening through which wire had passed healed; firm union of bone.

15*th*. Patient left hospital, with good use of his jaw, and with general health greatly improved. The sensibility of the integument about the angle of the mouth remained impaired.

Remarks.—The subject of fracture of the lower jaw has received proper attention from very few surgical writers. It is usually dismissed with a meagre consideration of simple vertical fractures of the body of the bone, and horizontal ones of the ramus and neck. The student is given to understand that there is no difficulty in the management of any of the varieties of fracture, if he will only mould a splint of leather, or of pasteboard, or of gutta-percha, to the chin, and keep the jaw up with a sling or a figure of eight bandage. When the oblique fracture of the body of the bone is alluded to, we receive generally no more information than Boyer gives when he says that it runs "downwards and backwards." Malgaigne is the only writer who has investigated the matter fully, and attached the requisite importance to the fracture running *obliquely through the thickness of the bone*. According to him, the case I have just reported must be considered an exceedingly exceptional variety of this particular form of oblique fracture. He remarks (*Traité des Fractures*, p. 381): "Je n'ai même trouvé que deux observations dans lesquelles le fragment postérior ait été vu dévié en dedans: l'une rapportée par Manoury, concernant une fracture produite par un coup de pistolet tiré dans la bouche; l'autre appartenant à M. Baudens, et sur laquelle nous aurons à revenir plus tard." Upon the relative position of the fragments must depend much of the difficulty in the management of the kind of fractures to which we are referring. When, as in my patient's case, the posterior fragment occupies the inner position, there is no obstacle to the action of the muscles attached to it, and it consequently goes inwards and upwards. Were the relation of parts reversed, the small fragment could not suffer such unfortunate displacement, for the anterior fragment would now prevent its passing towards the cavity of the mouth, and the upper dental arch would not permit of its tilting upwards. To correct displacement under these latter circumstances, and to preserve proper

apposition, we would simply have to manage the anterior fragment, and this we could do by ligating the upper and lower teeth, or by using some one of the many apparatuses provided with gutters for the teeth and means of counter-pressure under and outside of the jaw. Such are the apparatuses of Rutenick, of Bush, of Houselot, of Kluge, of Lonsdale, of M. Malgaigne (*Traité des Fractures*), of Dr. Sawyer, of California (*Am. Journ. of the Med. Sci.*, Jan., 1856). But in my patient's case it will be perceived that the absence of the molar teeth added another difficulty to those arising from the relative position of the fragments. This alone precluded the employment of valuable means suggested by the above named surgeons, and applicable, no doubt, to cases such as they detail. M. Malgaigne says: "Duverney avait songé au cas où la Mâchoire fracturée serait tout à fait édentée. Ce cas ne parait pas s'être encore présenté." The report of my case, then, furnishes the learned Frenchman with a *reality*, and I am pleased to say that it also enables him to realize the sanguine hope he so long ago expressed, that "la suture des fragments offriait une dernière ressource." The suturing of the fragments of a bone is not a recent procedure. Dr. Kearney Rodgers, of New York, as early as 1825, employed this means after a resection of the humerus for false joint, and Dr. Mott repeated the operation in 1831. (*N. Y. Med. and Surg. Journ.*, Oct., 1839.) In 1838 M. Flaubert, of Rouen, sutured the humerus for a recent compound fracture. (Malgaigne, *Traité des Fractures*, p. 276.) I know of no case except my own in which the lower jaw has been treated in this way. The *ligature* of the fragments, employed once, according to M. Malgaigne, by M. Baudens, resembles somewhat the treatment by suture, and perhaps should be preferably employed when applicable to the particular case. The ligature is passed through the soft parts by means of a needle, carried around the conjoined extremities of the fragments, and then securely knotted upon the teeth. In my case the line of fracture, traced from before backwards and from above downwards, was not sufficiently oblique to enable the ligature to act advantageously in securing apposition; and, moreover, the absence of the teeth seemed to me to contraindicate its employment. The ligature knotted upon the soft parts covering the alveolar process must occasion painful ulceration, soon become insecure, and prove a source of greater trouble than the perforating and suturing of the fragments.

CASE II. *Resection of the Knee-Joint for Disease of the Synovial Membrane and Cartilages, in a Patient fifty-eight years of age.*—Mrs. Ann Shae, a native of Ireland, aged 58 years, was admitted into the hospital on February 13, 1856, with disease of the right knee-joint, which she attributed to an injury received by jumping from an omnibus in New York many years ago. She was well known as having been long an inmate of our Almshouse Hospital, where she had been subjected to a variety of treatment, and where, finally, it had been several times proposed that she should submit to amputation through the thigh. She had always declined any operative interference. Upon inquiry, I found that she had been bedridden for two years,

and had constantly suffered from a painful tumefaction of the joint, with frequent exacerbations of more acute suffering, which usually subsided with the appearance of a purulent discharge through a fistulous opening which existed to the outer side of the popliteal space. The soft parts about the joint were much swollen, and chronically indurated and congested; the motions of flexion and extension were limited, and attended with acute pain; patient would not venture to put the foot of the diseased member to the ground. She was rather emaciated, but confessed the enjoyment of very good general health, except during the periods of increased tumefaction and pain of the joint, when she suffered from febrile excitement and much restlessness. Considering the age of the subject, the length of time she had suffered, and the inefficiency of all treatment to which she had been subjected by several good practitioners, I concluded that amputation would afford her the promptest and surest relief. I was satisfied of the existence of chronic disease of the synovial membrane and cartilages of the joint. The patient, however, absolutely refused any operative interference, but begged that I would treat her case, and give what relief was possible. I yielded to her solicitation, and, hoping even against hope, resorted from time to time to various plans of treatment, mainly of the alterative and tonic kind. The bichlor. hydr., mineral acids, hydriod. potass., bark, opium, different kinds of counter-irritation, the immovable apparatus, &c., were all brought into requisition, and to no purpose. Amputation continued to be rejected by the patient. I now urged the positive necessity for some kind of operative interference, concluding that resection of the joint was worth the trial, although the patient's age seemed almost to forbid the practice. Finally I secured her consent for the resection, and Prof. Geddings, the consulting surgeon of the hospital, having warmly advocated the procedure, the patient was chloroformed and subjected to the operation on the 24th of June. I adopted the procedure of Mr. Syme. Two semilunar incisions were started from a point, upon the outside of the joint, over the external lateral ligament, carried across the front of the articulation, one above and the other below the patella, and made to terminate over the internal lateral ligament at a point opposite to the one from whence they started. The capsule of the joint was thus freely opened, and the patella encircled. This bone was now found adherent to the condyles of the femur by bony anchylosis; this I had to break up by forcible efforts with my left hand before I could remove the bone.[1] The lateral and crucial ligaments were next divided, and the joint being freely flexed, I removed about an inch and a half of the femur and an eighth of an inch of the tibia. Much of the synovial membrane and the ligamentous tissue about the joint was in a state of pulpy degeneration, and I consequently cut away portions of these structures. The articular cartilages of the joint were deeply eroded, and at some points entirely deficient. No vessel bled sufficient to require a ligature. The extremities of the two bones came very well into apposition, so did also the lips of the wound. The wound was securely closed by suture and plaster. The limb was extended and placed upon a carved splint, with a foot-piece attached, and furnished with proper padding covered with oil-silk; a few strips of adhesive plaster served to secure the limb to the splint. The only difficulty encountered at first was the falling down of the tibia, and a slight tilting up of the

[1] I could never appreciate the advantages said by many surgeons to be gained by leaving the patella in cases of resection. In leaving it, we leave only so much additional osseous and fibrous structure predisposed to take on disease. Mr. Fergusson's experience leads him now to believe it best always to remove it.

femur, which prevented the accurate apposition of the extremities of the two bones. This I remedied by placing an additional pad, of proper thickness, transversely under the upper extremity of the tibia, and maintaining the lower end of the femur depressed by a broad strip of adhesive plaster carried around it and the splint. The patient being properly fixed in bed, two grains of opium were given, and cold irrigation of the limb ordered to be kept up; the opium to be repeated at bedtime. I shall omit the daily notes of the case, as these are not important, and the record would only prove tedious to the reader. Suffice it to say that for five or six days the patient was kept upon two grains of opium three times a day; cold water dressing was applied to the wound, and a plain nutritious diet allowed. To my astonishment, very little shock or febrile reaction ensued, and although the wound united only in part by the first intention, there never was any profuse suppuration. It was remarked by almost every one who visited the patient that she appeared not to have undergone any operation of a serious character.

June 24. Patient had taken a little hydr. mass and oil the day before, to relieve the bowels. This end had been accomplished. Wound looks well.

29*th*. The splint was removed, in order that the oil-silk and padding might be cleansed or changed. Care was taken to keep the limb quiet and the bones in apposition until the apparatus was readjusted. From this date nothing remarkable occurred except an occasional slight diarrhœa, accompanied with restlessness and inability to sleep. The liberal use of opium, and an occasional mild laxative, corrected this evil from time to time.

July 26. For several days the patient had complained of the pressure of the upper end of the splint near the ischiatic tuberosity. This had been partially obviated by stuffing in a little padding between the splint and the thigh. To-day, however, the complaint was greater; so I removed the splint, to examine the parts. An ugly sore was revealed at the point complained of. Upon examining the knee, I was gratified to discover that firm union had taken place between the osseous surfaces, and this almost solely by definitive or permanent callus. I could observe scarcely a trace of external provisional deposit. The thigh and leg seemed to be so entirely one, that I ventured to dispense with the splint, and put the member upon pillows; passing a few strips of bandage under these, and knotting the ends in front of the member, I was enabled to keep up the sides of the pillows, and thus secure a good lateral support for the thigh, leg, and foot. The wound of the soft parts had not yet healed; its inner and anterior portion presented an ugly weak granulating surface. This was dressed with the compound tincture of benzoin. To shorten the history of the case, let me say that the patient remained under my treatment in the hospital until the 17th of January, 1857, when she was discharged and took up her abode in the almshouse. During all the time that elapsed from the 26th of July to the date of the discharge her condition did not very materially change. She exercised a little upon crutches, but still the ulceration persisted; several abscesses had formed about the wound, and degenerated into sinuses; occasionally there would appear some increase of the inflammatory redness, with œdematous swelling of the leg and thigh. I subjected her to a variety of local treatment. Abscesses and sinuses were laid open; tincture of iodine was persistently injected into the fistulous openings; the efficacy of numerous lotions and ointments was fully tested; but all afforded very little benefit. Upon discharging the patient from the hospital, I concluded that the operation had been successful only in a very limited degree. Firm union of the

bones, it is true, had been obtained, the sufferer been freed from the painful irritation that used to follow the flexion and extension of the joint, and likewise released from absolute confinement to bed; but still her condition was such that I regretted that amputation had not been resorted to. Time, however, I am now glad to say, has reversed my decision and corrected my judgment.

Mrs. Shae was admitted into the medical ward of the hospital on the 20th of April of this year, to be treated for an attack of herpes of the trunk. I had the gratification of finding her almost rejuvenated, grossly fat, and, I may say, exuberant with health, if I except the eruptive affection, which was of little consequence. She was quite pleased to see me, and, I think, felt proud of her leg, which she acknowledged was worth more than many wooden ones. I examined the member with much curiosity. I found it quite as fleshy as the sound one, and two inches shorter upon measurement; the old ulceration had healed, and the cicatrix was firm; several of the old fistulæ, however, were still open, and, as she said, "discharged a very little, but gave no annoyance." She walked usually with a single crutch. At my request this was readily laid aside, and she walked with comparative ease about the ward. She had never resorted to any contrivance to make up for the defective length of the limb. I directed her to procure a proper shoe, with a sole of the necessary thickness; and with this, after some practice, I feel confident she must walk with comfort upon quite a useful member.

Remarks.—This case is interesting in several points of view. 1. I know of no case of resection of the knee practised upon so aged a subject. In Mr. Butcher's tables of these resections, recently published, including all cases operated upon previous to December, 1856, the most aged patient was forty-seven. 2. The very trivial constitutional disturbance that followed the operation in so old a subject, and the prompt ossific union that resulted, must go far to recommend the procedure, and to strengthen the opinion which regards the resection of the knee as a less hazardous operation than the amputation through the thigh. 3. The case illustrates the salutary changes which time may bring about in diseased conditions of the osseous and fibrous structures, and suggests to us the propriety of clinging to hope after some of the operations upon joints, rather than fly too hastily to amputation. 4. It is, I believe, the first case of resection of the knee-joint for disease practised in our country. Dr. Barton's operation above the joint, for straightening the knee, has been many times performed. Dr. Buck, of New York, in a case of bony anchylosis, with permanent flexion of the knee, cut a wedge-shaped piece of bone, including the patella, from the joint, and then forcibly fractured the posterior osseous lamina, lying in front of the popliteal vessels, in order to straighten the limb. Such an operation should not be confounded with resection of the joint in the ordinary sense. Since my own case, I have heard of one instance in which the resection of the knee has been practised, at the Pennsylvania Hospital, by Prof. Pancoast, of Philadelphia.

ART. IV.—*On the Efficacy of Cold Affusion in Narcotism.* By A. REEVES JACKSON, A.M., M.D., of Stroudsburg, Monroe Co., Pa.

UNDER the impression that the value of cold affusion, as a convenient and most effectual remedy in cases of narcotic poisoning is not generally so highly appreciated by the profession as it should be, I am induced to relate the following cases:—

Every practitioner who has had experience in such cases must have been painfully sensible of the impotency and impracticability of many of the ordinary means used in poisoning by narcotic substances. When the degree of narcotism is very great, emetics cannot be swallowed; the stomach-pump is frequently—in the country generally—not at hand; and galvanism, although a remedy of undoubted power, usually cannot be resorted to from want of the necessary apparatus. In view of these difficulties which surround the treatment of such cases, it is fortunate that there is a remedy always at hand, and one that in nearly every case in which recovery is possible by any means, is promptly effectual. That cold affusion to the head is a remedy entitled to this praise, and that it is one deserving much more attention than has generally been bestowed upon it, are facts which the following cases will, I think, fully substantiate.

CASE I. *Poisoning by Opium.*—On the 6th of March I was called in haste, by an Irish labourer who lived about one mile from this place, to see his son, a child eight months old. The father told me that the child was "clean dead," and "kilt entirely" when he left home, but was unable to give me any further information. On arriving at the place, I found the little patient in such a condition as almost to justify the father's expression.

Lying on the lap of its mother, its face was of a deathly pallid hue; the breathing slow, interrupted, gasping; the extremities were cold, and the skin covered with a clammy perspiration. The pulse at the wrist was barely perceptible in its feeble, thread-like beat.

I learned from the mother that she had been in the habit of administering to the child the preparation of opium known as *Godfrey's cordial* to make it sleep; and that having occasion to go to the village where she expected to be absent some length of time, she gave it, before starting, a *little more* than usual, in order that it might sleep until she returned. The quantity given on this occasion, she said, was about two teaspoonfuls, but as she made this admission with great reluctance, it was probably much greater. She was absent three hours, and when she returned the child was sleeping soundly, and she made no effort to arouse it until nearly an hour afterwards, when observing that it was unusually pale, she made an attempt to awaken it, but found it impossible to do so.

Five hours had now elapsed since the dose was administered. It was evident that the child was rapidly sinking, and that unless relief was quickly had, it would soon die. The stupor was so great that emetics could not be given—nothing could be swallowed. I had no stomach-pump at hand,

and there was no time to send for one; besides which, these means could not *rouse the patient*, which was to my mind the prime indication. I remembered that cold affusion to the head had been used successfully in some published instances, and I determined to give it a trial, although without the slightest expectation that it could be of any avail in this case.

Accordingly I ordered the father to procure a bucketful of cold water, and having the head of the child held over it, face downwards, filled a coffee-pot (they had no pitcher) and poured from it a steady stream upon the occiput in such a manner that the water ran off into the bucket beneath.

I had poured on two or three gallons in this manner, when suddenly I was startled by the child making a long, gasping inspiration, accompanied by a convulsive movement of the arms. My first impression was that it was dying. Raising its head, however, I saw that its eyes were open, and that its breathing was rather better than before the treatment was commenced. The eyes were almost immediately closed again, and, somewhat encouraged, I again poured on the water as before. In a very few minutes the child began to moan, and the breathing became more distinct; continuing the use of the remedy a few moments longer, it uttered a feeble cry.

I now desisted for a time, with the view of administering a solution of sulphate of zinc in warm mustard-water, but during the time occupied in preparing it the child relapsed into such a stupor that it was found impossible to rouse it by ordinary means sufficiently to enable it to swallow.

I again had recourse to the cold water, and with the same happy effect as before. In a very short time the child was once more roused to susceptibility, and cried out quite lustily. We now forced it to take a few doses of the emetic, which, aided by tickling the fauces, produced free emesis in half an hour. The matter vomited gave but little evidence, however, of the presence of the medicine.

Very little subsequent treatment was necessary. I ordered that small quantities of wine-whey should be given occasionally, and that frictions to the lower extremities be made with warm infusion of mustard, to obviate the resulting debility. In two or three days the child seemed to have regained its usual health.

CASE II. *Poisoning by Laudanum; Cold Affusion successfully employed.*—James H., aged 19, a blacksmith's apprentice, had been subject to neuralgia of the face, for the relief of which he used the camphorated tincture of opium, or paregoric elixir. About the middle of February, 1857, being attacked with the disease, and not having any of his customary remedy at the time, he procured from a neighbour a vial of laudanum, and being under the impression that the doses of the two articles were the same, he poured out a large tablespoonful and drank it. This occurred at 10 o'clock in the forenoon. In a few minutes he began to feel drowsy, and went to bed. About 4 o'clock P.M., one of the members of the family went up stairs for some purpose, and found him in what was supposed to be a dying condition. A messenger was immediately despatched for medical assistance, and the writer was summoned to see the case.

I reached the bedside of the patient about 5 o'clock—seven hours after he had taken the medicine—and learned the above particulars.

He was then under the full poisonous effects of opium. His surface was cold and clammy; his breathing irregular, slow, and stertorous—respirations eight in the minute; the pulse full, slow, and very irregular; the

pupils were tightly contracted and totally insensible to light; the countenance calm and pale.

I at once endeavoured to rouse him by speaking to him in a loud voice, by roughly shaking him, and by striking him smart blows with the open palm. These failing, we took him from the bed with the intention of moving him about the apartment between two assistants, but he was unable to bear the slightest amount of weight on his limbs. We then placed him on the bed again, and commenced beating the soles of his feet with wet towels. This also failed to elicit the least token of sensibility. I then dashed cold water in the face, hoping that I might rouse him sufficiently to enable him to swallow an emetic, although I thought it improbable that any of the poison still remained in the stomach. Although this caused him to start, and move his hands toward his face, yet as soon as the dashing of the water ceased, he at once became insensible again.

I now concluded to use cold affusion to the head; and having everything properly arranged, commenced pouring the water upon the head from a large pitcher held at a height of about eighteen inches. The effect appeared almost magical. Before the pitcher was emptied he opened his eyes, and evinced by his actions that the treatment was unpleasant. It was continued, however, and in a short time he was fully aroused. Nausea and vomiting now supervened, and the retching was so violent and long-continued that all remaining symptoms of drowsiness were banished. A cup of strong coffee finally checked this and completed the cure.

CASE III. *Poisoning by Belladonna treated by Cold Affusion.*—Mrs. H., the wife of a clergyman, had been suffering several days with severe neuralgia of the rectum, caused by the irritation of internal hæmorrhoids. I had been using a great variety of remedies, but as is usual in such cases, none produced more than temporary relief.

On the evening of May 7th, 1858, the pain was unusually intense, and I ordered a suppository containing one-third of a grain of sulph. morph. This gave almost entire relief from the pain, and she passed a tolerably comfortable night. Next morning, however, she awoke with headache, an intolerable itching, and nausea and vomiting, which continued throughout the day, and she positively refused to use opium in any form again. In the evening the pain returned as severely as before. I ordered the bowel to be cleansed by a laxative enema, to be followed by an injection consisting of a watery solution of extract of belladonna. I used the Shaker preparation, and laid out a portion containing about one grain, directing that it be dissolved in two ounces of water and thrown into the rectum and retained there.

About midnight I was hastily called to see the lady, and on my arrival found her surrounded by her friends who were greatly alarmed at her condition. She was lying on her back in bed, completely insensible. The face was of a bright red colour, and somewhat swollen; the breathing slow and quiet, entirely without stertor; pulse 130, small and hard. The eyelids were closed. On separating them the globe appeared injected and prominent; the pupils were widely dilated and directed forward with a fixed, vacant gaze. The patient appeared entirely unconscious, although she occasionally made an apparently painful attempt to speak. The muscles of the face, particularly about the mouth, moved convulsively. The arms were also slightly convulsed. The skin was warm and perspiring abundantly.

The husband informed me that inasmuch as the anodyne enema I had ordered had failed to allay the pain, he thought best to repeat it, and did so in *one hour* after giving the first. He said he had used a piece of the extract about the size of a *pea*, that he thought it was about the same size as the portion I had used. He further stated that in a short time after using it, the patient complained of feeling very warm, of some derangement of the head, and of an unquenchable dryness of the mouth and throat, with difficulty of swallowing. She also complained of confusion of vision, of giddiness, and of headache of a beating, throbbing character. These symptoms were followed by a light, good-natured delirium, a wandering loquacity, and extravagant, ridiculous actions, together with occasional nausea without vomiting, and ineffectual attempts to urinate.

Various means were used to rouse her without effect. Ammonia was cautiously applied to the nostrils; she was spoken to in a loud voice and roughly shaken, but "still she slept."

My first object was to remove any of the poison that might yet remain in the bowel; and for this purpose I ordered a large enema of thin gruel. After this had been administered I had preparations made for using the cold water. A large tub was placed on the floor near the side of the bed, and the patient being placed crosswise on the latter, with the head and shoulders projecting, and supported by an assistant, I commenced pouring a steady stream upon the back part of the head and neck. In a few minutes she opened her eyes, but reclosed them immediately. The face became gradually paler. In about five minutes she made an attempt to articulate, and pointed towards her mouth. Some water was put into her mouth, but she could not swallow it.

The use of the cold affusion was now suspended, as the patient appeared to be cold and shivering. She was placed in bed and lightly covered. In the course of ten or fifteen minutes her skin became hot, the face was flushed, and she again fell into a profound sleep. Once more the cold water was employed, and soon she again became conscious. A piece of ice was now placed in her mouth, and appeared to afford her much relief, although she could not articulate with sufficient distinctness to be understood.

The enema was now returned without any admixture of feces, but containing a considerable quantity of the belladonna, as was made evident both by the colour and odor of the discharge.

The patient, although drowsy for some hours, recovered without the use of any other remedy.

Her vision remained dim and confused about three weeks.

Remarks.—As far as I am aware, all the cases of narcotism in which cold affusion has been used heretofore, have been produced by opium or some of its preparations, and in such cases the efficacy of the remedy has been demonstrated beyond a doubt.

The case of Mrs. H., just related, shows, as far as a single case can show, that it is no less prompt where belladonna is the poisoning agent; a fact which derives additional importance from the circumstance that this medicine is now in such very general use.

Toxicologists agree in stating that where an overdose of belladonna has been taken, the stomach and intestines are peculiarly insensible to impressions; and, in fact, the whole nervous system is temporarily paralyzed.

This fact of course detracts very much from the amount of dependence to be placed on emetics and purgatives, even when they can be swallowed, and obviously enhances the value of a remedy so simple, so convenient, and which promises to be so useful as cold affusion to the head.

Evacuants, even admitting that they produce their full therapeutic action, can do little more than rid the system of that portion of the poisonous substance which is still unabsorbed, and although highly useful for this purpose, and not to be neglected, yet as remedies to relieve the *narcotism already produced*, and which forms the real source of danger, they are comparatively worthless.

Hence the necessity for a remedy which has the power to stimulate the nervous system to a sufficient degree of action to maintain the vital functions, while labouring under the prostrating influence of a narcotic poison.

Of all the means proposed for this purpose, cold water is the one most readily obtained, most easily and quickly applied, and on which most reliance may, I conceive, be placed.

ART. V.—*On the State of the Nutritive Functions during the Progress of Continued Fever.* By BEDFORD BROWN, M. D., Yanceyville, Caswell Co., N. C.

ACCORDING to present opinion, the absorption into the system of a certain morbid poison, is the prime cause of continued fever. Admitting this to be true, it is still questionable whether it is the sole and immediate cause of all of the pathological changes and phenomena which arise during the progress of that disease. On the absorption of this poison into the circulation, a deleterious impression is first made, we believe, on the blood. The essential nature of that impression is an impairment of the vital and nutritive properties of that fluid. This may be considered the primary stage of typhoid fever.

There are also changes of a secondary character, which are not only the immediate cause of some of the most important pathological phenomena of the disease, but in reality exert a controlling influence over the course and termination of it. The true nature of these changes is imperfect nutrition of the organized tissues.

The mental depression, the physical prostration, the remarkable decline of the organic functions, and the rapid emaciation, all afford abundant proof of the serious impairment which the nutritive and assimilative powers have sustained from the very beginning of the attack. Many of the leading symptoms or indications of morbid conditions, either of a functional or organic character, occurring in fever, are not peculiar to it. These identical symptoms are equally as common in the course of many other diseases.

The integrity of the intellectual and physical powers is now known to depend on certain regular and constant molecular changes which the tissues undergo in the assimilative process. These changes consist in a well-balanced process of renewal and destruction of structure. Now, when this balance is disturbed, in either the general assimilation or the nutrition of any particular organ, functional and organic derangement must be the consequence. Every action of an organ, whether of an animal or organic nature, causes that organ to sustain a loss of a certain amount of material by disintegration, and without a compensating renewal of matter it would be no longer capable of acting again, or would act imperfectly. Now many of the morbid phenomena of continued fever are in truth due, as an immediate cause, to the defective renewal of material to sustain the molecular condition of the different tissues. These phenomena consist of organic changes within the tissues, derangement or impairment of the various functional operations of the individual organs, and of the entire organism. To produce these effects, there is a double cause in operation in typhoid fever. First, on the absorption of the morbid poison, which generates the disease, the nutritive properties of the blood are primarily affected. They may be simply impaired to a certain extent, or so far destroyed as to suspend the nutritive process instantaneously and cause immediate death. Again, the digestive organs, being imperfectly nourished, fail to elaborate proper materials for assimilation. It is a remarkable fact that in all of those blood diseases, in which the nutritive operation is greatly impaired, the structure of the various organs and tissues are found in a softened condition after death. This cannot be accounted for otherwise, than by the supposition that proper material has not been regularly supplied for interstitial renovation.

To substantiate these opinions, it will be necessary to go into an investigation of the physical condition of the blood in fever, and of the influence exerted on the interstitial condition of the individual parts of the organism, by a deficient supply of nutritive matter for assimilation, together with the special symptoms arising from such a state in the form of deranged or suspended functions.

I believe that a correct understanding of this subject has a most important bearing on the management and treatment of the disease; so much so, that it is well worthy of the labour of a thorough investigation. Indeed, with our old notions of "Nervous Irritation," "Excitement," &c., and the false importance attached to them as chief elements in the pathology of fever, I consider, while entertaining such views, that we are totally unqualified to manage successfully a severe case of this disease.

Physical Condition of the Blood in Typhoid Fever.—According to analyses by the best authorities, the nutritive properties of the blood are diminished in continued fever, particularly the amount of fibrin. This diminution dates from the commencement, and increases not only as the

disease advances, but in proportion to the severity of attack. In the latter stages of severe cases, the blood becomes thin, poor, and greatly deficient in solid material. It is probably the fibrinous or plastic materials, of all others, are the most important for the support and nutrition of the human fabric. This diminution is not limited to quantity. The vital qualities are equally impaired. This is plainly manifest by the difficulty with which the blood sustains the vital action of resolving inflammations, and of healing wounds and ulcers. There is also a corresponding decrease in the quantity of salts in the blood of typhoid patients.

Effects of Innutrition on the Condition of the Nervous System in Fever.—In severe cases of continued fever, delirium, subsultus, vigilance, finally somnolence and coma, are always present. These symptoms are not peculiar to typhoid, nor even to fevers of a kindred nature, but are common to all diseases in which there is a deficiency in supply of properly elaborated materials, for the constant renovation of the nervous mass. In the simplest of all forms of innutrition, that of starvation, wherein all food is withheld from the system, these identical symptoms are developed to a prominent degree.

The brain has failed to receive its usual and proper quantity of albumen, phosphorus, fatty matter, &c., for the renewal of its structure, and consequently the functions proper to it become unsteady and irregular, and finally end in total cessation, when nutrition has been suspended.

The physiological principle that every action of an organ causes it to sustain a loss of a certain amount of substance by disintegration, and without a corresponding or compensating renewal of matter, the same organ would no longer be capable of acting again, is admirably illustrated in this case.

In the early stages of fever, when the nutritive process is but slightly impaired, the functions of the brain are not as vigorous as in health, the mind is vacillating, and the will is unsteady and not as capable of directing as usual. There is an unusual gloom and depression hovering over it, or there is an indifference to consequences and a disposition to surrender. Nor will the muscular powers respond to the mandates of the will as common. Here is plainly a want of nervous vigour and strength, induced by a slight impairment of interstitial nutrition. I have no doubt that the nutritive operation begins to decline as soon as the morbid poison of fever is absorbed. In proportion as this operation is interfered with, the course of the disease will be rapid and violent. About the second or third week of fever, when the nourishing properties of the blood are becoming seriously damaged, and the integral renewal of nervous matter is partially suspended; then it is, that what was early in the attack but slight falterings of the nervous energies, become marked failures of organic action, which gradually merge into delirium, subsultus, then somnolence, and finally coma, telling the truth too plainly that the functions of the brain are abolished, because

there is no longer material in the blood for the renovation of tissue, and the supply of waste which the organ has sustained.

The peculiar nervous symptoms of delirium tremens I consider a good example of the influence exerted on the functions of the brain, from impaired nutrition and waste of nervous matter. That the nutritive properties of the blood and nutrition of the tissues suffer greatly from constant imbibition of alcohol is not doubted.

After exhausting hemorrhages from any cause, the supervention of nervous symptoms is an invariable consequence. Here we witness violent delirium, convulsions, muscæ volitantes, and coma, originating from a cause that cannot be mistaken, which consists absolutely in a non-supply of nutritive material for the sustenance of the nervous system. Whilst the defect in this case is due to quantity of material—in the case of continued fever the quality is equally at fault. The effects, organically and functionally considered, are very much the same. The human system can be starved to death as readily by altering the quality of the blood, as by reducing the quantity.

What is termed "False Hydrocephalus" affords another instance of extreme derangement of the nervous system from want of sustenance. In this peculiar disease, all of the nervous symptoms are present that usually attend acute inflammation of the brain. Yet after death not a trace of organic lesion can be discovered; to the contrary, the brain is found pale, wasted, and softer than natural. During the protracted progress of chronic indigestion, a great variety of nervous symptoms arise, though differing somewhat from the foregoing. The moral and mental vacillation of the dyspeptic: his variable temper—his whims and caprices—the extreme excitability of his nervous system—his tendency to melancholy, and finally to confirmed lunacy, are all substantial evidences that his brain is suffering for the want of a properly elaborated supply of nutritive matter. A large portion of the ingesta taken into the stomach in dyspepsia, when not rejected by that organ, or passed through the intestines in an unaltered form, is so improperly reduced and converted, that it is rendered unfit for purposes of assimilation. Hence this material, instead of being appropriated for the renovation of tissue, after floating about in the circulation, is eliminated as waste matter, much of it from the kidneys in the form of lithates, phosphates, &c.

I have deemed it necessary to produce these cases as evidences not simply confirmatory of the fact that symptoms of nervous derangement are a common sequence of imperfect nutrition, but to establish the equally important fact that such symptoms are not confined to continued fever, but are equally as frequent in other diseases in which defective nutrition is a prominent element. Again, I wish to combat the idea that nervous derangement is attributable, in fever, merely to "irritation" or "sympathy," both vague and indefinite terms. Neither can the nervous derangement of fever be the

immediate result simply of the impression of the specific cause of that disease, for such derangement rarely occurs until that stage when the general nutrition is beginning to fail. At the same time such symptoms are equally as common in diseases in which the morbid poison of fever is entirely absent. The correct comprehension of this subject has a most important practical bearing.

Condition of the Circulatory Organs in Typhoid Fever.—The heart, of any single organ, has one of the most difficult parts to sustain, not only in fever, but in all other diseases. On it devolves the duty of sending the vital fluid to the remotest parts of the body, and thence receiving it in return, discharging it into the pulmonic system, to be subjected to atmospheric action. The great fatality of continued fever is not at all astonishing when we consider, in connection with these important and necessary duties, what a vast influence any impairment or withdrawal of the adequate amount of nutritive materials has on the heart's action. A decline in the heart's action in fever assumes an importance paramount to all other considerations. If the principle that every time an organ is brought into action it sustains a certain loss of material by oxidation holds good in other instances, it is especially so in regard to the heart in typhoid fever. That organ, so long as life remains, must continue in operation unceasingly, in this particular differing from all other organs. When we know that, in common with other parts, in fever it fails to receive the due proportion of nutritive material for the renovation of its tissue, and, at the same time, that this tissue is constantly undergoing a disintegrating process and waste caused by rapid and incessant action, the powers of the organ to maintain the all-important duties devolving on it are truly wonderful. Doubtless the failure of the heart's action in asthenic cases is due to the fact that there is not a sufficient renewal of material to supply the waste of cardiac tissue and sustain its vital action.

In some of the most malignant cases of fever that I have ever witnessed the heart's action was extremely feeble and slow. No amount of artificial stimuli could arouse it to increased action. These cases terminated more rapidly in death than those in which the circulation was greatly increased. Indeed, the explanation of this seems to me to be the utter failure of the nutrition of the substance of the heart. The disintegration and waste of cardiac substance caused by a pulsation of a hundred and forty or more to the minute must draw heavily on the powers of the heart, and, without a compensating renewal of material, such increased action must of necessity result in softening of the tissue of the organ, and exhaustion of its powers. In my opinion, herein consists one of the chief dangers to be apprehended from a rapid circulation in fever. Hence the importance of controlling the circulation. Softening of the cardiac tissue is frequently found after death from continued fever, and is probably more frequent than is even supposed. This is a mere fragment of a great constitutional change that is ever in

progress in fever, and a certain consequence of imperfect assimilation from impure blood. A loss of affinity between the fluid and solids in fever is the probable cause of most of the intercurrent inflammations occurring during the progress of the disease. The healthy circulation through the capillary system is no doubt materially influenced, and even regulated, by the condition of the nutritive process. When the integrity of that process has been impaired, a disturbance of the capillary circulation will necessarily follow. Hence the occasional occurrence of congestions and subacute inflammations in fever.

Influence that Hemorrhage exerts on the Progress of Fever.—All practical physicians are aware of the danger of hemorrhage as a complication of continued fever, and hail it with dread and apprehension. I believe it can be truly said that there are but few diseases in which the body suffers more from loss of blood than in this. So strictly is this the fact, that but few physicians will resort to bleeding, even in inflammatory complications. Now, when the nutritive properties of the blood are so materially diminished as they certainly are in fever, it is not surprising that the occurrence of hemorrhage should exert such a baneful influence over the progress of the attack. There is another difficulty, also. In fever the capacity of the digestive and assimilative organs for the elaboration and formation of new blood is imperfect. I have in more than one instance witnessed what previously was a very mild attack of fever converted into a most malignant one by a comparatively moderate amount of hemorrhage. To bring forward additional testimony for the purpose of sustaining my opinion, that, namely, many of the phenomena and symptoms of fever are due, as an immediate cause, to a defective amount of nutritive material in the circulation, and an imperfect state of the nutritive process, to cite the agency of hemorrhage in modifying an attack of fever is almost sufficient of itself. One instance we will select as an example. An attack of fever that has observed a comparatively mild and moderate character up to the supervention of a considerable hemorrhage. Suddenly the entire aspect of the disease changes; new features appear, that were absent before; a total perversion of the animal and physical powers takes place; there is delirium, subsultus, and coma, a very rapid and feeble action of the heart, a sudden decline of animal heat, and, in fact, all the signs of the exhaustion of the fountains of nutrition.

The Accumulation and Escape of Effete Matter in Fevers.—The degree of diarrhœa is a very good criterion of the amount of effete matter accumulating in the circulation. When the quantity of nutritive matter in the blood is reduced so far below the standard of health, the disintegration of tissue and accumulation of effete matter must be very great. This effete matter doubtless escapes from the system principally through the intestines and skin in fever. That the diarrhœa of fever is chiefly due to ulceration of intestinal glands I cannot believe any more than that diarrhœa is the principal element in cholera. There is something more than the elimination of the fluid portions of the blood. There is a great constitutional revolu-

tion at work in both instances, in which the molecular structure is rapidly being broken down, and the cell formation and growth is arrested. How can the excessive emaciation and waste of the textures be accounted for, except by the fact that some agent having been introduced, has impaired, or even arrested, the nutrition of the body, by acting on the vitality of the blood? The balance between the formation and disintegration of structure is lost in favour of the latter process. The *débris* of broken tissue must find an outlet through some emunctory. No, the causes of typhoid and choleraic diarrhœa are further back in the depths of the system than any change confined to the intestinal tube could produce. The accumulation of that substance known as "typhoid deposit" in the intestinal and other glands is, I believe, nothing more than a portion of the general mass of effete matter in the system, and which is finding an outlet in this manner. But then the copious diarrhœa of fever is not to be encouraged from a false belief that all the effete matter in the circulation is useless, and should be expelled as soon as possible. To the contrary, it is a well-established principle of physiology that much of this matter is not only not useless, but, when retained, is constantly being reassimilated into the solid structures.

Sloughing and Ulceration during Continued Fever.—When the healthy nutrition either of a portion or of the entire body has been materially interrupted, the disintegrative absorption of the solids becomes so rapid as to assume the form, in particular localities, of sloughing and ulceration. This state of things is particularly liable to occur in parts in which the circulation is rendered more feeble than natural, either from mechanical or physiological causes. I regard what is termed the bed-sore of fever as a true type of the vital condition of the system, and an accurate representation in miniature of the state of the great nutritive operations going on in the constitution. By it we are enabled to observe, on a small scale, these operations in progress, and to learn the important fact that the solid tissues are breaking down and wasting away for the want of a healthy renewal, and that the process of disintegration is in the ascendency. The absorption, in protracted cases of fever, of the osseous unions of old fractures, and of the cicatrices and wounds of ulcers long healed up, afford another instance of the imperfect state of the nutritive functions and the rapid destruction of tissue.

ART. VI.—*The Pathological Relations of Cancer and Tubercle.* By JOHN H. PACKARD, M. D., of Philadelphia. (Read before the Academy of Natural Sciences, Biological Department, May 2d, 1859. Recommended for publication, May 31st, 1859.)

THE mutual relations of cancer and tubercle, and their position in reference to other adventitious formations, taking into the account not merely

the information afforded by minute anatomy, but also that derived from clinical observation, seem at the present time to demand investigation. Such an inquiry, to exhaust the subject, would far transcend the limits to which I must here confine myself; and hence, all that will be attempted will be to give a general survey of the merits of the question, which may, however, prove not unprofitable.

Experience has shown that, in order to accomplish anything in this important branch of pathology, a diligent use of every available method of investigation is requisite. To endeavour to work so vast a mine, either with the microscope alone, or entirely without its aid, would at the present day be unphilosophical, if not actually absurd.

Now, if there be such a property as malignancy predicable of any morbid deposits, *cancer* and *tubercle* are those of which it is most undoubtedly so. And this property, being supposed, can be explained in either one of several ways.

Thus, a new element may be imagined, formed in, or entering into the nutritive material supplied to the whole organism, and separated by means of a specific growth, which must, in this view, be regarded as an extempore gland.

Or, the new growth may be looked upon as the starting-point, from which the mischief radiates throughout the system, just as a poison placed upon the surface might enter the circulation.

Or, the nutritive material may be considered as merely undergoing deterioration, by virtue of which it expends itself in the production of useless and irregularly organized forms.

Or, an abnormal element may be supposed to enter, or to be formed in the blood, determining an excessive and irregular evolution of textures, not essentially abnormal.

The facts which are now to be brought forward and compared, may perhaps enable us to appreciate better, the respective values of these theories, or at least may be suggestive to those who are aiming at the solution of the problem upon which they bear. In order to arrange the facts at command most conveniently, they will be presented under the usual heads of etiology, symptoms, morbid anatomy, &c.

I. The *causes* of cancer and tubercle, like those of many other forms of disease, are oftentimes extremely obscure, and observers are apt to be betrayed into serious inaccuracies of thought and expression upon this subject. Some mere coincidence is not unfrequently assumed as the prime cause, it may be to the entire exclusion of the real, but less obvious agency. Now the conditions causing or favoring the inception or development of tuberculous disease, are in some respects similar to, in others widely different from those bearing the same relation to cancer.

Hereditary predisposition is an influence to which both cancer and tubercle are often ascribed. But this phrase is vague, and may therefore

become a source of misconception. The embryo does not probably derive from either parent any superadded element of disease; but there is either an error or a deficiency in the formative force with which it is *ab initio* endowed. Nor can it ever be asserted that the offspring of parents, in one or both of whom tubercle or cancer exists, is absolutely free from the same view of constitution. Circumstances may so influence the successive generations derived from a tuberculous or cancerous pair, as to hold the disease entirely in abeyance, perhaps to do away with it altogether; and, since it can never be proved that this has not occurred in any case, some colour is given to the idea that hereditary transmission is the sole source of these disorders. In other words, cancer and tubercle are either inherent in all the descendants of parents so affected, or they may at any time be spontaneously generated under incidental influences. But, if the former view be accepted, then another dilemma is unavoidable: either these two forms of disease are identical, or they must at some past period have arisen separately; unless, indeed, upon the supposition of a plurality of races, we suppose also a corresponding plurality of diseases, races and diseases becoming alike mixed at a later period. Whatever ground may be assumed upon the preceding points, tubercle much more commonly seems to be formed as a consequence of similar disease in the parent than does cancer.

Either of these diseases, when apparently inherited, may put on a different form in the child from that which it bore in the father or mother. Thus, if the latter had pulmonary tuberculosis, the offspring may have tuberculous marasmus; if scirrhus of the breast, the child may have encephaloid disease of the eye. Tuberculous disease of the lungs, and cancerous disease of the alimentary canal, are more apt to reappear unchanged in the offspring than any other special forms; but to explain this circumstance would not be difficult.

It must, however, be observed that hereditary transmission is not, strictly speaking, a *cause* either of cancer or of tubercle, and its influence is so very apt, for many reasons, to be over-estimated, or even to be altogether imaginary, that it is not safe to argue too positively from it.[1]

Age has less to do with the development of tubercle than with that of cancer; at least, the distribution of the former is more equable among persons at all periods of life. Very many cases of tuberculous disease are met with in those who have not yet arrived at adult age; but this cannot be said of cancer. According to the researches of Lebert, scrofulous affections attain their maximum of frequency between 15 and 20 years, tuberculous, at about the 30th year;[2] while the average for all forms of cancer

[1] See an interesting paper upon this subject by Mr. Paget, originally published in the Med. Times and Gazette, Aug. 22, 1857, and quoted in the Am. Journal for Oct. 1857.

[2] Traité Pratique des Maladies Scrofuleuses et Tuberculeuses, p. 58.

places their maximum at the 50th.[1] Hence, taking into consideration the fact of a majority of every population being below the age of 30, and assuming the very close alliance, if not the identity of scrofula and tuberculosis, we have a result which agrees with general observation, viz., that tuberculous disease is very much more frequent than cancerous. There is, however, one point to be borne in mind in estimating these conclusions, and that is that while they may be correct as regards France, or European countries generally, they may not answer for other parts of the world. Accurate statistics would perhaps show the proportionate numbers and ages to be precisely the same in the United States; but, until these are obtained, any assumption to that effect must be carefully qualified.

Sex has a very marked influence in regard to cancer, the number of women affected being said by Lebert to exceed by more than one-third that of the men. It is otherwise, according to the same author, with tuberculosis, the sexes being much more nearly upon an equality; but here the proportion is known to vary in different countries, and the different forms of the disease, as well as the parts affected, are found to give quite diverse results. Some interest would attach to an accurate investigation into the relative proportion of single and married women among the victims both of cancer and of tubercle.

(As regards the circumstances of *age* and *sex*, in relation to cancer and tubercle respectively, I subjoin the following extracts from reports made to the Legislature of Massachusetts; considering them as reliable as any statistics can be which depend for their accuracy upon that of numerous individuals, and more so than any others to which I can at present obtain access.

There were registered in that State, in 1856—

DEATHS FROM—		Under 5 years.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Unknown.
Cancer, 217.													
Males	72	4	1	...	...	3	1	10	12	18	15	7	1
Females	145	7	2	...	1	1	10	28	35	32	15	14	...
Consumption, 4701.													
Males	1943	205	18	20	132	458	365	244	191	168	103	29	10
Females	2754	211	20	66	266	792	518	300	206	169	148	35	23
Unknown	4	2	...	...	...	...	...	...	1	...	...	...	1
Scrofula, 95.													
Males	51	23	5	...	1	5	3	3	6	1	4	...	...
Females	44	21	2	2	4	3	2	5	...	2	1	2	...
Tabes mesenterica, 205.													
Males	100	89	1	...	...	1	...	...	1	5	1	...	2
Females	105	87	2	...	...	3	5	2	1	3	...	...	2

[1] Traité Pratique des Mal. Cancéreuses et des Affections Curables Confondues avec le Cancer, p. 138.

The corresponding register for 1857 shows—

DEATHS FROM—		Under 5 years.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80.	Unknown.
Cancer, 242.													
Males	78	5	2	...	...	4	3	4	12	25	17	5	1
Females	164	...	1	...	...	7	25	31	35	29	22	12	2
Consumption, 4625.													
Males	2030	189	32	20	131	455	355	277	224	206	116	15	10
Females	2593	152	49	53	252	713	452	301	216	197	153	43	12
Unknown	2	1	...	...	...	...	...	...	...	...	..	...	1
Scrofula, 104.													
Males	64	31	5	10	3	3	2	3	1	2	3	1	...
Females	40	16	2	1	2	2	3	2	2	3	6	...	1
Tabes mesenterica, 224.													
Males	111	91	3	1	...	3	3	3	2	3	2	...	...
Females	111	97	3	...	...	5	3	2	1	...	...	...	...
Unknown	2	2	...	...	...	...	...	...	...	...	...	...	...

It is not improbable that cases of cancerous and tuberculous disease are included also under the following heads: Cephalitis, diarrhœa, hydrocephalus, disease of lungs, disease of spine, tumours, and disease of uterus. But I have thought it best to omit all these, since their bearing upon the present subject is not sufficiently definite to warrant any conclusions from them.)

Complexion, or rather the peculiarity of constitution denoted by it, possesses a high degree of significance in connection with the present subject. Tuberculosis is well known to be of very common occurrence in negroes and mulattoes, while they are seldom affected with cancerous disease. And although among scrofulous or tuberculous white people, there are many with fair and many with dark complexions, it would not be easy to mistake the peculiar signs of this diathesis.

Residence in the city or country would be *à priori* expected to exert a different influence from that which it really does. The more favourable hygienic circumstances of those who live in the country do not prevent their suffering from tuberculous disease in nearly the same proportion as do the inhabitants of towns,[1] while cancer seems actually to find fewer victims among the latter than among the former.[2] And although these facts are hitherto unexplained, they are so well established as to demand consideration.

Occupation has something to do with the development of both tubercle and cancer, but its influence can only be precisely ascertained by means of data, which it is difficult to procure. It is a matter of common observa-

[1] Lebert, Maladies Scroful., etc., p. 72.

[2] Walshe on the Nature and Treatment of Cancer, p. 162. Lebert, Mal. Cancéreuses, etc., p. 131.

tion that persons of sedentary habits are liable to tuberculous disease; which, with the fact before mentioned, that the rural population afford a majority of cases of cancer, would seem to show a material difference in the circumstances favouring these respective morbid conditions. Such a conclusion cannot, however, be looked upon as positive, for this reason, if for no other: in the city a larger proportion of deaths occur below the age at which cancer mostly prevails, than in the country. Moreover, as Lebert remarks, scrofula and tubercle are, as a general rule, developed before any occupation has been long pursued.

Depressing causes, such as a temperature habitually low, insufficient nutriment, and mental emotions, have long been regarded as promotive of scrofulous and tuberculous disease; and are by some writers assigned a like relation to cancer. The comparative degree of influence of different climates upon the formation of tubercle is said by Lebert[1] to be very nearly equal; but it must not be forgotten that many countries in which a high temperature prevails, are in a great degree populated by races predisposed to this variety of disease. Cancer, although apparently affected more immediately by varieties of temperature, is not so in reality; it seems, as Dr. Walshe[2] remarks, to bear a direct ratio to the degree of civilization and social advancement. This latter idea must, however, be somewhat qualified, when we recollect the large number of cases of cancer afforded by the country as compared with the city.

Insufficiency of nutriment, although doubtless not without its influence in the aggravation of the symptoms, whether of tuberculosis or cancer, is not a demonstrable cause of either.

Mental depression has always held a prominent place in the list of causes now under discussion, but its influence cannot be proved except in a minority of cases. Without entering upon the trite and obscure subject of the mutual reactions of mind and body, and with all deference to the opinions of many eminent authors, I may remark that there must be supposed a prior tendency to the disease, the mental state being a mere auxiliary agent. Dr. Walshe alludes to cases observed by him, "in which the connection" between mental affliction and cancerous disease "appeared so clear and decisive, that to question its reality would have seemed a struggle against reason."[3] He says immediately afterwards, however: "But the extent to which this influence works practically has doubtless been over-estimated." And the number of cases constantly observed, both of tuberculous and cancerous disease, in persons entirely free from mental depression, with the frequency of mental depression neither connected with nor followed by either of those diseases, must surely weaken the claims of this condition to rank among their efficient causes.

Thus far we have been concerned with predispositions; it may be doubted

[1] Op. cit., pp. 78 and 93. [2] Op. cit., p. 61. [3] Op. cit., p. 155.

whether the exciting causes can be determined with greater accuracy than these, or with less. Is there such a thing as an immediate cause of cancer or tubercle, no favouring condition having existed previously? An answer to this question may be obtained by examining *seriatim* the circumstances usually so considered.

Depressing causes sometimes seem to bring on tubercular disease, as, for instance, in a person who has sustained severe affliction or endured very great privation, and who soon afterwards, as the saying is, "falls into a decline." The same may be said of antecedent diseases, such as enteric fever, or intra-thoracic inflammation. But there is always ground for suspicion in these cases that the mischief had been going on in the economy for a longer or shorter time; a suspicion strengthened by the fact that in so many instances the same agencies are quite as powerfully exerted without inducing the same results. In regard to cancer, the evidence is even less clear in favour of their efficiency, and we can only say that they appear to be not without influence.

External violence is often assigned as the cause of cancerous growths. It seems sometimes to bear the same relation also to the formation of tubercle; thus tuberculous disease of bone, of the testicle, or of a joint, is quite commonly attributed to it. I have reported a case to the Pathological Society,[1] in which deposits of this nature in the cerebrum and cerebellum of a boy six years old began to manifest themselves almost immediately after he had sustained a severe blow on the back of the head. But in this boy, as in almost every other case of tuberculous or cancerous disease, there was evidence of previous constitutional infirmity, aside from the fact that so many blows and contusions are unproductive of any such results.

The idea that tubercle and cancer propagate themselves by *contagion*, although formerly defended, is untenable.

From the preceding survey of the conditions favouring or inducing the development of cancer and tubercle, it may be seen that while the influence exerted respectively by inheritance, sex, occupation, and the various sources of persistent depression of the vital forces, seems to correspond somewhat closely in the two diseases, this cannot be said of the other circumstances alluded to.

Thus a remarkable discrepancy exists between the earlier and later periods of life in regard to the relative frequency in them of these two diseases, either of which, however, may occur at any age; and this must surely be allowed to possess some significance.

So also the very marked tendency, or rather perhaps *aptitude*, of the African race for tuberculosis, and their comparative exemption from cancerous affections, must be capable of some interpretation.

[1] North Am. Med.-Chir. Review, Jan., 1859, p. 91.

And the facts connected with the influence of occupation, and of city and country life, as well as with that of external causes, seem to combine with the foregoing to indicate that some essential difference exists between these two forms of disease.

Now, carrying the investigation further in regard to this branch of our inquiry—etiology—is there any real distinction to be drawn between the causes of cancer and of tubercle and those of other morbid deposits? It has already been remarked that the tracing up of known facts to their true causes is very apt to be a matter of extreme difficulty. And in very many instances nature seems to gratify the wildest caprice in regard to the matter in question. Fibrous tissue, bone, cartilage, may be thrown out in the most irregular and purposeless manner. But in the case of tubercle and cancer the clearest evidence is presented of a vice of constitution, of which the local deposit is but a minor consequence. That this abnormity is not identical in both these forms of disease would be inferred from the considerations already brought forward in relation to the conditions under which it manifests itself in each; and in proceeding to examine the clinical differences between tubercle and cancer, and between these and other affections, the specific character which each bears will, I think, be rendered still further evident.

II. Under the head of *symptoms* may be included all the phenomena which fall under the notice of the clinical observer—such as the seat of disease, mode of attack, amount and kind of pain, duration, mode of termination, &c.

In regard to the *seat of disease* remarkable differences present themselves between cancer and tubercle, and between these and other forms of morbid deposit; and these differences are essentially modified by the circumstances of *age* and *sex*.

Here, however, it must be noted that the statements of authors are to be received somewhat conditionally. Entire reliance cannot be placed upon the accuracy of statistics derived from any and every source. Sound pathological views can be arrived at only by the most rigid scrutiny of facts, especially where diagnosis is involved, this being the point concerning which errors are so commonly and so fatally committed.

To the best of our present knowledge, certain parts are altogether exempt from certain morbid deposits, while they are the chosen seats of others. Again, some organs seem to constitute a sort of neutral ground, being occupied now by one form of disease, and now by another; and of this group some are exempt at one time of life and not at another, or in one sex and not in the other, while some are alike exposed at all times and under all circumstances. The mammary gland and uterus, so well known as extremely liable to cancer, may be pronounced absolutely without the range of tubercle. In the brain either cancerous or tuberculous deposits may occur, and so also in the lungs, alimentary apparatus, and genito-

urinary organs. Hence it may be stated, in general terms, that the range of tuberculous disease in the economy is much less extensive than that of cancer, notwithstanding the much greater frequency of its occurrence.

But here we must note the influence of age and sex. In children the mammary gland and uterus are, for obvious reasons, free from liability to cancer, while the eye and brain are its most usual seats. But in male children the testicle is found to be thus diseased quite as frequently; and it would be an inquiry of some interest whether its analogue in the female—the ovary—shares in this disposition. Tubercle, often a primary disease of the alimentary apparatus in the child, is seldom so in the adult. Considering the relative frequency of tuberculous and cancerous affections, the brain of the child, or at least its membranes, may perhaps be equally subject to either; but in the adult brain cancerous deposits are of much more common occurrence.

As regards the genito-urinary apparatus, the influence of sex is quite marked. In the female the urinary organs are exempt from cancer in a much greater degree than in the male, while the uterus is very subject to it. In the male the genital organs and the urinary are much more nearly on a par in this respect. Even here, however, we find that the former are decidedly preferred by the disease.

The very great rarity of cancer as a primary deposit in the lungs, and the extreme frequency of tubercle, are so well known that they need not here be enlarged upon.

Now there are some aspects of the circumstances just mentioned in which it would seem as if cancer and tubercle might be only different manifestations of one and the same morbid element; thus we might be told that the difference between cancer of the female breast and tubercle of the testis was dependent wholly upon incidental influences; that in cancer of the lung and tuberculosis of the mesenteric glands the same agent was at work, but under different auspices. If, however, these diseases are not by any means thus limited—if, in individuals otherwise placed upon the same level, each form of disorder has its distinguishing features, such a supposition loses its plausibility. It now becomes necessary, if possible, to show that this is so, that the phenomena presented in the one case are essentially diverse from those in the other.

Cancer, as is well known, is deposited in masses of very variable size, generally beginning with a single one, very small, which gradually enlarges and spreads; around this others sometimes seem as it were to radiate, like offshoots. Tuberculous matter appears, on the contrary, to stud the substance of parenchymatous organs with minute masses; it has not the same disposition to usurp the place of the normal structures that cancer has, but makes its inroads by virtue of a sort of sufferance. Such is the course of things in the lung; in the alimentary canal, while cancer always gives rise to a stricture by inclosing the tube with a firm and more or less narrow

ring, tubercle seems rather to undergo a process of excretion, being deposited upon and thrown off from the mucous surface. Nor do we find, either in the mesenteric glands, or in those of the lymphatics elsewhere, that tubercle does more than fill up these organs; but cancer infiltrates and surrounds them, so that their outlines are but dimly traceable in the hard, irregularly nodulated mass which results. In the brain the shape and size of tuberculous deposits differ much less from those of cancerous, as a general rule.

The precise seat of either of these formations cannot in some cases be determined; but, except in the case of the alimentary canal, as already mentioned, they usually seem in the same organ to occupy the same anatomical position. It is otherwise in regard to the points at which they appear. Thus the proneness of tubercle to occur at or near the apex of the lung is a matter of common observation; but, according to Walshe,[1] cancer attacks the more central portions of the organ in preference. Cancer very often invades the œsophagus or the stomach, tubercle is not met with above the ileum.

The *mode of attack* of cancer often, but not always, differs from that of tubercle. A person destined to fall a victim to either may enjoy perfect health, to all appearance, until suddenly struck down by the disease. But tubercle more commonly gives warnings, be they heeded or not, of its approach; and having declared itself, it at the same time pervades the organism and wraps the patient in a false security. Cancer takes hold of one organ, perhaps of several, and bides its time; years may elapse before it claims attention; meanwhile it slowly strengthens its position; at length an accident reveals its presence, and from that time forth its victim feels himself in its power.

Tubercle seems, therefore, if the expression be not too fanciful, to betray its subjects by an insidious approach, while cancer asserts itself sturdily, and renders life a burden by the very delay of its *coup de grâce*.

The *duration* of tuberculous disease varies greatly, as also does that of cancerous. When the brain is the organ attacked, disorders of either class are apt to prove rapidly fatal, although Dr. Wood[2] says that death may be postponed for several years. A case is alluded to by Dr. Pepper,[3] in which certain symptoms had existed for several years, when their true significance was made manifest by other indications of a cancerous growth in the brain; these latter signs, however, were not offered until about three months before death. I have myself seen two cases of large tuberculous deposits within the cranium, in which there had been perfect health until six months before the fatal issue; in two others the disease lasted about one year from the date of the first symptom. But, in truth, it is a matter of great difficulty

[1] Op. cit., p. 343.

[2] Practice of Medicine, vol. ii. p. 614.

[3] Med. Examiner for Dec. 1856.

to assign this date accurately, even in cases in which the disease is external; and much more when the brain is the organ affected. I may, however, mention some general results. Lebert, in the works already cited, states the average duration of tuberculous meningitis as eleven to twenty days, but does not specify any period for similar diseases seated within the cerebral mass. From a table given by him, comparing the duration of encephalic cancer (including meningeal and cerebral) with that of non-cancerous deposits, it would appear that the latter run a much more rapid course. Dr. Wood[1] assigns the third week as the period of greatest fatality in tuberculous meningitis, while Walshe alludes to cases related by Graff and Louis, in which meningeal cancer existed for thirty-seven and forty years respectively.

Cerebral cancer and tubercle seem therefore to be more nearly on a par, as to duration, than meningeal; but, on the whole, the course of tuberculous disease within the cranium is more rapid than that of cancerous.

In the lungs the average duration of tuberculous disease does not differ very materially from that of cancerous, so far as can be ascertained. But as out of forty-four cases of the latter character, collected by Dr. Walshe, thirty-three were in persons over thirty years of age, while phthisis finds more victims between the twentieth and thirtieth year than in any other decennium of life, there is evidently an element wanting in the comparison.

When tubercle is deposited in the alimentary canal, the fatal issue is seldom long delayed. I have recently reported a case to the Pathological Society of Philadelphia, in which the mucous surface of the colon and ileum was thus affected in an extreme degree, in a child who had enjoyed perfect health until within six days before his death. And the same remark may be made of the mesenteric glands. But the average duration of cancerous disease in this locality is stated by Lebert[2] to be something over eighteen months; a fact not without its comparative significance.

Peritoneal cancer and peritoneal tubercle, as far as I can ascertain, are generally thought to run their course with about an equal degree of rapidity.

I have now endeavoured to show that in some of those organs which are, as it were, the common ground of cancer and tubercle, such marked differences exist in the period of continuance of those diseases, as to favour the idea of a general distinction between them. Cancer seems, on the whole, to progress more slowly than tubercle does, in the cases most nearly parallel.

Pain, a very constant and prominent symptom in almost every instance of cancer, is often absent altogether in cases of tubercle. Even in the brain, where perhaps these diseases resemble one another most closely, the paroxysmal character of this phenomenon, when the deposit is tuberculous, is very marked; while that attending cancer is apt to be persistent, at least after the disease is fully developed. Patients whose lungs are perfectly

[1] Op. cit., vol. ii. p. 604.

[2] Malad. Cancér., p. 562.

studded with miliary tubercle may be free from any suffering except that dependent on difficulty of breathing and on the inflammation inseparable from such a morbid state; but in cancer of the same organs there is always the well-known *lancinating* pain superadded to this. Mere pain is, however, far from diagnostic of cancerous disease, since the "painful subcutaneous tumour" is destitute of all malignancy,[1] while, as its name imports, it gives rise to very great suffering. Nor are cases wanting in which the pain caused by cancer amounts to little or nothing, especially in some organs and in certain varieties of the disease. Still, so very large a majority of cases are marked by the continual occurrence of severe, darting, lancinating pains, due apparently to some special property of the morbid growth, that more or less importance must be attached to this phenomenon in reference to the subject now under discussion.

The *mental state* of persons affected with cancer is apt to be one of great depression; they are morose, gloomy, despondent, and irritable. Tuberculous disease, on the contrary, seems to induce a sort of exhilaration, which is persistent in spite of its speciousness; and this remark holds good of all its forms. Nothing is more common than to see a child, saturated, as it were, with scrofula, bright, happy, and contented in a far greater degree than its more healthy playfellows; or to see an adult, far gone in pulmonary phthisis, whose very appearance indicates speedy dissolution, hugging the hope that he may soon be better, and smiling at the fears felt for him by his friends. The extreme and wearing torment caused by cancer may, indeed, in some measure, account for its attendant depression, but cannot be looked upon as altogether explanatory of it. I have myself been deeply impressed with the importance of this phenomenon in the present light, from having observed three cases of extensive tuberculous deposit in the brain, in adults; in all of these there was severe suffering, and yet unimpaired cheerfulness; in one the mental balance was destroyed, but so late in the disease as not to affect the value of the fact. Every one of the few cases of cerebral cancer which have come under my notice has been attended with great depression of spirits.

Hectic fever is universally recognized as of very frequent occurrence in tuberculous diseases, while it is extremely rare to see anything approaching to it in cases of cancer. And it is a symptom of so distinct and definite a character, that the simple fact of authors omitting it, or dwelling so little upon it, in describing the latter affection, is not to be overlooked.

The blue line around the edges of the gums, and the incurvation of the finger nails, so commonly noticed in pulmonary tuberculosis, if met with at all in cancer, have at least a very far less prominent place among its phenomena; my impression is that they do not so occur. These peculiarities are hitherto unexplained, but have a greater degree of diagnostic value than would at first sight appear.

[1] Paget, Lectures on Surgical Pathology, Am. ed., p. 393.

Every one is aware of the very marked relation which often exists between fistula in ano, hæmorrhoids, ulcers, or other external diseases, and pulmonary tubercle. Now, of this fact I would make use in two ways. In the first place, it seems to denote clearly that in tuberculosis there is something more than a mere defect of nutrition; for mere debility is not aggravated by the cessation of a drain upon the system. Nor, secondly, do these affections occur so commonly in cancerous individuals; and when they do, their removal is not followed by any aggravation of the main disease, unless they have partaken decidedly of the same character; so that the error of nutrition productive of cancer would seem to be more marked than that of tuberculosis.

Tumours, strictly speaking, are less frequently formed in tuberculous than in cancerous disease. In the brain, the abnormal growth is, in either case, apt to constitute a separate mass. The lungs, when the seat of tuberculous deposit, are almost always contracted in size, if changed at all in this respect; but when cancerous, they may even cause bulging outwards of the intercostal spaces. As has been already said, when the mesenteric or other lymphatic glands are tuberculized, they are simply swollen; when cancer attacks them, it eventually buries them in a confused mass of adventitious matter. The morbid deposit, in a cancerous pylorus or rectum, is readily distinguishable; in tuberculosis of the intestine, it is constantly discharged by the diarrhœa which its presence induces. In the kidney, according to Dr. Walshe,[1] tuberculous disease is not only very rare, but seldom or never gives rise to any considerable enlargement of the organ, while in cancer its mass is apt to be very greatly augmented. Of the testicle, the same may be said; and it would be useless to dwell upon the fact that cancer nearly always manifests itself externally by a tumour of more or less volume, as for instance in the mammary gland.

We must therefore conclude that the inherent, assimilative, or formative power of cancer is greater than that of tubercle.

The *termination* of any disease must be either by the death of the part affected, or by its restoration to health. Where the disease involves the entire organism, the same statement holds good; the patient either gets well or dies, or else his disorder cannot be said to have terminated.

Neither cancer nor tubercle is apt to stop short of the destruction of life. And the fatal issue may be owing to the obstruction of functions by the local disease, to exhaustion, or to intercurrent inflammations; to say that it might result from the action of a specific poison would be to assume more than has yet been proved. Further enlargement upon these points would be irrelevant to the object now in view; but it may be well to mention that the first and second of the causes above alluded to, seem to act in concert in a larger proportion of cases of tubercle than of cancer. In other words, the power of cancer to exhaust the system, without directly

[1] Op. cit., p. 391.

interfering with any function—to concentrate in itself, as it were, the vital force of the organism—seems to be greater than that of tubercle. There is one mode in which tuberculosis of the lungs proves fatal, which, so far as I can ascertain, has never been observed in cancerous disease of those organs—viz., by the rupture of a bloodvessel at the seat of the deposit. And although this is not of frequent occurrence in phthisis, yet it does happen often enough to be one of the inevitable dangers of the affection; while the consolidating and transforming influence exerted by cancer upon the bloodvessels is sufficient to account for its entire absence here.

Much greater importance attaches to the favourable terminations of these diseases. It is a well-established fact that tuberculous deposits may undergo cretification, and become perfectly harmless; it is also probable that abscesses of a tuberculous character may, after the discharge of their contents, heal up entirely. Here the morbid deposit is either converted into an innocuous foreign body, like an encysted bullet, or is gotten rid of altogether. Cases are likewise said to have occurred, in which cancerous masses have disappeared, or been thrown off, or ossified.[1] But I have met with no satisfactory account of any such instance; and in fact, by the time a cancer arrived at a state in which it could be thrown off, the system at large would almost certainly betray the influence of the disorder; while the mere fact of a tumour disappearing under treatment would afford to most minds ground for doubting its cancerous character. As to ossification, irregular formations of bone are sometimes met with in cases of malignant disease of the testicle, and perhaps in other organs; they form, indeed, an essential element of the "osteoid cancer" of Müller, but that they constitute a transition stage towards health has never yet been shown.

Whether a cancerous mass is separated by an incision through the adjacent sound structure, or spontaneously by a process similar to that for the removal of a mortified part, the local disease is for the time done away with. But to assume that the individual so relieved is cured, is to assume that the local disease is either all, or at least the *fons et origo mali;* which assumption is not warranted at the present stage of our argument.

It may therefore, I think, be asserted that neither cancer nor tubercle can ever be disposed of in any other way than by their virtual death; since during their continuance within the sphere of life, as living tissues, they are not known to pass into the condition of healthy organs, nor do they disappear altogether from the economy without a manifest process of ejection. And in this respect, these deposits differ from all other forms of morbid growth, as will be further shown hereafter.

A question of importance, in connection with the clinical history of cancer and tubercle, is, whether these deposits are mutually convertible? Do cancerous parents endow their children with a tendency to the formation of tubercle, or the reverse? Do scrofulous children ever grow up, to

[1] Walshe, op. cit., p. 134.

die of cancer at a maturer age? Or does the same growth ever present, at different periods of its existence, the distinguishing properties first of one and then of the other form of disease? If such cases ever have occurred, they are not upon record, so far as I can ascertain, nor is their possibility alluded to by authors. So far, therefore, as a negative proposition can be maintained, it may be confidently asserted that cancer and tubercle are not convertible.

(Perhaps it may be as well here to explain, that I do not mean to deny that the son of a man who dies of cancer may be carried off by phthisis, or that a scrofulous child cannot possibly, his scrofula being cured, subsequently become the subject of cancer. Unless cancer and scrofula or tuberculosis are diseases which must pertain to the patient and his heirs forever—unless they never can be spontaneously developed, we may surely imagine one of them to be done away with, and the other to arise at a later period.)

Another interesting question has reference to the co-existence of cancer and tubercle in the same individual. Of all the cases in which this concurrence is stated to have been observed, there is not a single one in which we have conclusive evidence that one part of a deposit was cancerous and the rest tuberculous. And of the few cited by reliable authorities, in which the same person presented formations of both kinds, some doubt may perhaps still be entertained by the sceptical. But here let us note that wherever the cancerous disease may have occurred, the lungs were the invariable seat of the tubercle; and moreover, that the symptoms of the latter affection were always more or less masked by those of its powerful rival. It would therefore seem as if the tubercle had been a mere local disorder, intercurrent to the cancerous disease of the system at large, and perhaps an indirect result of the impairment of nutrition.

When a cancerous testicle is removed, a fresh deposit of the same nature will very commonly be found to occur in the cicatrix; but this does not happen when the affection is tuberculous; here the disease will be apt to be transferred to the lungs. Again, in the lung of a person dead of phthisis there may be the cicatrices of old cavities, surrounded by healthy tissue; the subsequent deposits of tubercle having taken place at other points in the organ. The tenacity with which cancer fastens upon a single part is shown by this fact, as well as by others already mentioned. Some external deposits may imitate tubercle in this respect; I have seen an epithelial tumour of the lip recur twice after removal by the knife, and each time at a different point, the cicatrices remaining perfectly healthy to the present hour.

It may be thought that in the foregoing discussion there has been too little said concerning other adventitious products—that cancer and tubercle have been too exclusively considered. But having now gone over the main facts in the clinical history of those forms of disease, their relation in this respect to other morbid growths may be summed up in a few words.

The comparative infrequency of non-malignant formations in the young, may be accounted for by the employment of the plastic energy in the completion of the frame. And these growths are much more evidently under the control of the assimilative power of the normal tissues, than cancer and tubercle are; they generally occur in direct connection with some healthy structure to which they are analogous. Thus we do not find fibrous tumours in the brain; they are always, when intra-cranial, connected with the dura mater. Occasionally, cartilage is met with as a morbid deposit in the lung, testicle, &c.,[1] but always where a strong suspicion, or even proof positive, of malignancy exists. And I think it may be asserted that growths clearly innocent, although they may either push aside or cause to be absorbed the adjacent tissues, never transform them into their own likeness, as seems so palpably the case in cancer. The pain which occurs in tumours of the former kind can always be explained, except sometimes in its degree. No definite rule can be laid down as the average duration of innocent tumours, since they do not display any aggressive tendency, but if they destroy life, do so as it were indirectly. They may become absorbed under the influence of pressure, or become spontaneously atrophied; and if removed by operation or otherwise, the entire disease is gotten rid of.

III. Without entering at any length into the subject of the morbid anatomy of cancer and tubercle, I wish merely to touch upon a few of the prominent points of discussion in regard to it, mainly in order to show more clearly the object of this paper, and thus to give force to the preceding considerations.

The anatomical theory which prevailed until within the last few years was, that malignancy resided in certain textures essentially unlike any of the normal constituents of the frame; and that the local disease reacted upon the system in such a way as to enhance and aggravate the vitiated condition originating it. Expressions are sometimes used which would imply that the primary lesion may be an entirely local formation; and that this latter, taking on a malignant character, may infect the whole organism; but such an idea is not borne out by facts.

An attempt is now making upon the part of many pathologists, to show that cancer and tubercle are homologous with some of the simpler anatomical elements of the economy; in other words, that those morbid deposits are not visibly specific.

Errors in nutrition must consist either in excess, deficiency, or perversion. Cancer and tubercle are evidently due to errors in nutrition; now if their anatomical elements are homologous, the error *as manifested locally* is one of excess, and not of perversion. And even if the position of those elements, either with regard to one another or to other tissues, be abnormal, the error is not essentially modified. The material furnished from the blood must be just the same as that from which the same tissue is elsewhere developed;

[1] Paget, op. cit., p. 421.

and although the arrangement of the component parts of the morbid growth should not be just the same as in its healthy analogue, still the error is mainly one of excessive production only.

Now, in the view of those who sustain the theory last mentioned, tubercle is an exuded matter which progresses no further than to the formation of nuclei. But this view is, I think, altogether set aside by the fact, that in growths confessedly cancerous, which are increasing rapidly—and in which, therefore, great formative activity is displayed—microscopic examination almost always reveals hosts of free nuclei; I think I may say that this phenomenon is invariable in such cases. Nuclei being present in plastic matter, cells are formed as an easy consequence; in other words, the origination of a nucleus is the great step, and constitutes sufficient evidence of the possibility of that of the cell. And if it be said that in the case of tubercle this subsequent step does not occur because material is wanting, it may be asked how it is then that fresh nuclei can be developed. It seems to me that such a theory implies that the greater is possible where the less is not.

As regards the idea that cancer-cells are merely misplaced, and not essentially abnormal, there are some considerations which militate strongly against it, and others, chiefly I think negative, which favour it. Virchow's comparison of these forms with epithelial cells is in many cases very plausible; so also is that of Wedl, with the elements of areolar or connective tissue. On account of the difficulty of assigning clearly the mode of inception of elements really heterologous, as well as of explaining wherein the heterology exists, whether it be local, constitutional, or both, views so convenient are apt to be readily accepted.

Opposed to this theory in all its modifications, is in the first place the fact that both cancer and tubercle are met with in situations where neither epithelium nor areolar tissue exists normally; as, for instance, within the mass of the cerebrum or cerebellum. Secondly, the fact that when these growths do occur in parts supplied with those normal forms, they do not obey the same laws, or manifest the same effects, that mere excessive productions of those forms would; thus, a cancer of the uterus runs a widely different course from that of a fibrous tumour of the same part. Thirdly, the fact that these formations do not, although evincing a high degree of energy, go on to the full development of their alleged homologues; thus, the elements of a cancer which has been slowly growing for ten or fifteen years can hardly be regarded as on a par with "*young* connective tissue," especially as so many tumours of this kind do actually contain fully-formed areolar or connective tissue. And when an increase in the rapidity of growth is observed, this does not manifest itself in the completion of the so-called partly developed material, but merely in a fresh accumulation of similar elements. Fourthly, the fact that neither tubercle nor cancer can be induced by merely modifying those conditions of any part which concern

its nutrition; in proof of which it may be mentioned that cases of pneumonia would, on such a supposition, seem in the highest degree likely to end in tuberculous disease, while in reality they very seldom do so. Fifthly, the fact that in their apparent origin, in their clinical history, and in their anatomy, cancer and tubercle have very few features in common with other forms of disease.

I am by no means prepared to offer any theory as to the true explanation of malignancy in morbid growths, or even to assign its primary seat. Cases sometimes occur in which the system seems, as it were, saturated with a poison, which breaks out in multiple manifestations; in others the disease seems to be almost altogether local, at least for a time. Now, in these latter there is much more of an analogy with the ordinary course of syphilis than in the former, which are more closely allied to its purely constitutional secondary or tertiary developments.

Perhaps it is as unphilosophical to strive to do away with mysteries, as to abandon all hope of clearing them up; and the true course here as elsewhere lies between the two extremes. The foregoing remarks have been called forth by the tendency which seems to me to have acquired an undue prevalence of late, to allow the clinical history of cancer and tubercle to be overshadowed by their minute anatomy. Nothing is gained by an attempt, upon insufficient grounds, to prove the conformity of malignant growths to normal types of structure. The field is so vast, that one corner may engross too much attention, and a mass of material may be neglected while a small modicum is worked over. Conclusions based upon insufficient data are sometimes confirmed, but are quite as often overthrown, by subsequent research; and I cannot think that the time has yet come when we can decide the question whether the matter of cancer and tubercle is or is not specific—is homologous or heterologous. Let it be remembered that the study of this subject, under altogether favourable circumstances, has been but very recently begun; and that the surest way to its elucidation is not the driving of its obscurity into less accessible ground, but careful generalization from the largest possible amount of accurate and systematic observation.

ART. VII.—*Successful Treatment of a Case of Ligamentous Union of Fractured Radius and Ulna by Drilling and Wiring, after Failure by other Means.* By E. K. SANBORN, M. D., Professor of Surgery in Castleton Medical College.

ALTHOUGH cases of *non-union* or *ligamentous union* of fractured bones are of considerable frequency, and, when occurring, are of most serious consequence to both patient and surgeon, it would probably be the feeling

of most surgeons, if expressed, that there is no class of surgical cases in which they would operate with less certainty of success, or be more embarrassed in the selection of the best method of operation, than the one under consideration; for, notwithstanding a varying degree of success has followed a great variety of operations for ununited fracture, the very multiplicity of methods recommended by distinguished authorities is a virtual confession of the inadequacy of any operation yet devised to safely meet in all cases the surgical exigency of a confirmed *non-union*.

The *seton* has been successful in many cases; but it has also failed in more cases, probably, than any other means, because, on account of the comparative ease with which the operation is performed, and its apparent freedom from danger, it has been performed more frequently than any other operation. But, aside from the uncertainty attending the introduction of the seton, the recovery, if it takes place, is prolonged and tedious, and the operation is not always free from danger, particularly from erysipelatous inflammation, induced by the presence of so large a foreign body in the cellular tissue.

Resection has also had its triumphs; but it has also signally failed; and, where recovery takes place, it is not a restoration of the strength and proportions of the limb, on account of the shortening which is necessarily involved in this operation. It is also a dangerous operation; and a *failure*, if it is not accompanied by loss of the limb, generally precludes all chance of success from any subsequent operation.

The method of *drilling* the ends of the fractured bones, to induce adhesive inflammation, which has been introduced within a few years, though not a difficult or dangerous operation, and in many cases a successful one, is still unreliable, for it has failed, after thorough trial, in repeated instances. Dieffenbach's operation, of introducing ivory pegs, and Langenbeck's modification of it, the substitution of iron screws for the pegs, are severe operations, and the former, at least, uncertain. During the winter of 1854 I had the pleasure of seeing the distinguished Berlin surgeon, Langenbeck, perform his peculiar operation in two cases with success; and he informed me that it had never failed in his hands, though he had not applied it in the *femur*.

On returning home, I recommended the operation in a case of ununited fracture of the humerus, and assisted to perform it. On the second day it became necessary to remove the screws, in consequence of the violence of the inflammatory action, which soon took the form of *phlebitis*, and resulted in destruction of the head of the humerus, abscess, and finally anchylosis of the shoulder-joint. Although the patient's life was endangered by this operation, yet the union of the bone was perfect, and the arm is now strong and useful.

Though strongly impressed in favour of the German operation by the results I saw from it in the hands of its skilful originator, my experience

in the above-mentioned case has not inclined me to repeat it; though I am fully of the belief that the complication of phlebitis, &c., in the case arose from accidental causes, which could be avoided in another operation.

A case of ligamentous union in both bones of the forearm has been treated by me within the last few months, with such satisfactory results as greatly to increase my confidence in the efficacy of surgery in these cases, and also to confirm my belief in the "*law of tolerance of living structures for the presence of foreign metallic bodies.*"

CASE. Mr. J. H. P., of Vermont, aged 33, of lymphatic temperament, and inclined to corpulency, broke his forearm in January, 1858, while at work in the woods. The points of fracture were—*radius*, upper third; *ulna*, junction of middle and lower third, or about three inches below the upper fracture. The fracture was simple, and presented no extraordinary features in any respect. The limb was dressed by a neighbouring physician without any delay; four plain splints being used, according to the patient's account, and the arm being suspended by a sling in a *prone* position. After the lapse of four or five weeks it was ascertained that no union had taken place, and, by the advice of another physician, a single splint (*Goodwin's spoon splint*) was substituted for those originally adjusted. Subsequently a starch bandage was applied over the splint. The fracture still giving no signs of consolidation, several attempts at inducing union by rubbing the ends of the bones together, &c., were made during the three following months, but with no effect. In September, eight months subsequent to the accident, the patient went to Albany for advice and assistance, and finally placed himself in the hospital for treatment. A seton was introduced at the point of fracture in the radius, the fractured ends of the ulna were drilled, and the ligamentous union lacerated subcutaneously. On the third day symptoms of erysipelatous inflammation appeared about the upper wound; and on the fourth day the seton was removed, in consequence of the violence of the local and general disturbance. The inflammation soon subsided, and the patient, after remaining in the hospital three and a half weeks, returned home with the arm in splints, with some appearance of commencing union, at least in the upper fracture. These appearances, however, were fallacious, and in November the patient returned to Albany, where the operation of drilling, &c., was repeated. No perceptible effect followed the second operation, and the patient soon returned to his home.

In December—a year, within a few days, from the time of the accident—the patient presented himself to me for examination and advice. The limb then presented the usual features of false joint. There was no soreness of any part; the limb was, however, entirely powerless—not strong enough to sustain its own weight—while the ends of the fractured bones could be readily felt as the arm bent by the weight of the hand.

The patient was naturally very much discouraged, and had little faith in any further attempts on the arm. I proposed and explained the operation that I finally performed, after his assurance that he should not, at any rate, return to the hospital. He left, undecided as to his course. In about two weeks he returned, and placed himself under my charge; and on the 23d of December I performed the following

Operation.—Having previously decided to operate on but one fracture at a time, I selected the upper one, or the radius, for the first trial. I first

made an incision, about four inches in length, on the radial side of the forearm, directly over the fracture. The incision was then extended down to the bone, and the broken ends displayed. A knife was then passed through the fracture, separating the connecting ligament readily. The ligamentous covering was then carefully dissected from the end of each fragment. The fracture was found to be *oblique*, the lower fragment lying by the side of the upper, and separated from it about *half an inch*. The wedge-shaped end of each fragment was then bored through with a small gimlet, at a distance of three-quarters of an inch from the end, and through these holes a *stout silver wire* was passed, and the ends twisted with strong clasp forceps until the broken ends were firmly held together in the loop. The external wound was then loosely brought together by adhesive strips, the twisted ends of the wire projecting an inch or more from the middle of the wound. The limb was placed in an elbow-splint—made of tin, for the purpose—extending from the axilla to the fingers. The splint was placed on the inside of the arm and forearm, and was deep enough to embrace one-half the circumference of the limb, while the wound was left free for dressing, &c., without disturbing the arm. The wound was finally dressed with lint and cold water.

The patient underwent the operation without any anæsthetic, by preference. One small artery only was ligatured.

Dec. 24. Saw the patient at 9 A. M. Found him in bed, with some febrile symptoms. Pulse 100; face slightly flushed. Chiefly complained of pain in the head and back, which prevented him from sleeping the latter part of the night. No pain of consequence in the arm. Changed the dressings. Found the limb swollen below the elbow, with bloody serum discharging pretty copiously from the wound. Ordered a saline cathartic, with mucilaginous drinks.

25*th.* Patient passed a better night than the one before, though complains still of pain in head and back. Pulse 90. Is sitting up, and makes no complaint of the arm.

Jan. 2. Nothing worthy of mention has occurred up to the present time. The wound commenced discharging freely on the fourth day, and the swelling has rather increased, though there has been no particular pain in the limb. Last night there was a sudden recurrence of pain in the head and back, accompanied with difficulty of breathing, and cough. The limb was observed also to be hot, and more painful, with an erysipelatous blush extending up to the elbow. At eight in the evening I applied a solution of sulphate of iron as a lotion to the limb, and gave directions for its assiduous application during the night; also administered a diaphoretic mixture. This morning I found the patient relieved, with scarcely a trace of inflammation in the skin, which is yellow and shrivelled under the application of the iron.

20*th.* The patient has been progressing favourably. There is now no soreness. The wound has healed up, as far as the projecting wire will allow it. Very little discharge from the wound. No swelling in the limb generally, and very little about the fracture. Took the arm out of the splint, and found no evidence of union. The wire was loose in the bones, and could be handled without giving pain. The arm was carefully replaced in the splint, and with strong clasp forceps the wire was twisted as tightly as the patient could bear.

22*d.* The operation of twisting the wire has been followed by pain and

swelling, and increased discharge. The pain, however, is up and down the radius. At the point of fracture, also, the bone is extremely sensitive, and the least touch of the wire gives great pain. Patient is now taking phos. lime and chalk in considerable quantity.

24*th.* The swelling and sensitiveness in the region of the fracture have greatly diminished. The wire has also become slightly loose in the bone. Something like an ensheathing callus is observable at the point embraced by the wire. The wire is again twisted until the patient exclaims from pain.

Feb. 1. The operation of twisting has been continued every alternate day up to the present time. A temporary discharge has been produced, but the increase of the *callus* is quite evident. This morning, while twisting the wire as usual, the small neck of bone that held it gave way, and the wire was wholly removed.

2*d.* Removed the arm from the tin splint, and made a careful examination. The *union* is evident, though it is not firm. As the swelling has nearly subsided, I substituted the *gum and chalk bandage* for the splint, enveloping the limb from the axilla to the fingers with several layers of bandage smeared with a thick mucilage of *acacia*, thickened to the consistence of white paint with *pulverized chalk*, leaving a small open space opposite the small wound whence the wire was removed.

15*th.* Removed the gum bandage, and found the union quite firm. A small abscess occurred, just over the point of fracture, a week since, but it is now closed. The patient having the impression that the lower fracture is also consolidating under the influence of the stiff bandage, it is reapplied, and Mr. P. goes home to await the result.

March 16. The expectations of the patient in regard to the fracture of the ulna have not been realized. Although the arm is quite strong, and the use of the thumb and first and second fingers is recovered, the condition of the false joint in the ulna remains unchanged. Accordingly to-day I performed on the *ulna* precisely the same operation that I previously did in the case of the *radius*. I will not go over the details of the second operation, which would be merely a repetition of the first account. The condition and situation of the bones were nearly the same as in the radius. A little more difficulty was experienced in introducing the wire than in the first instance, on account of the inability to *turn out* the ends of the bones from the wound, as was readily done in the operation on the radius. The same splint and dressings were used as in the previous operation.

April 1. No unfavourable symptom has been manifested since the second operation. The wound has nearly closed. A large *node* or *callus* has been thrown out about the wire, and union is evidently taking place. The patient is out of doors daily, and has not been confined to bed since the operation.

12*th.* The wire was to-day removed by gentle twisting and traction, and the union found to be quite firm. The arm was replaced in the splint.

20*th.* The wound in the arm has been closed several days. The patient is gradually beginning to use the arm. Both fractures are *perfectly consolidated.* The power of pronation and supination is possessed to a considerable degree, and it is quite evident that a little *use* is all that is required for the complete restoration of the motions of the arm.

May 21. As a completion of the somewhat extended history of this case, I will only add that I have had frequent reports, up to the present date, of

the daily improvement of my patient's arm under the influence of daily exercise about the farm.

Remarks.—The wire used in these operations was composed of four threads of silver wire, of the size recommended by Dr. Simms for sutures. Being closely twisted, they made a wire of the size of a small knitting-needle; and, from its perfect flexibility and strength, I found it much easier of introduction, and more manageable afterwards, than would have been a single wire of similar size and strength.

The difference in the *time* of union in the two fractures will have been noticed by the reader. In the *radius* there were no signs of union on the thirtieth day after the operation.

In the *ulna* union was quite evident as early as the sixteenth day after the operation, and apparently firm in twenty-eight days.

In the *radius* the wire was so firmly held in the bones as to be removed with great difficulty, and after repeated trials of the *twisting* process.

In the *ulna* the wire was removed, without force, after *once* twisting with the forceps.

Undoubtedly one reason why the second fracture united so readily was the *immobility* secured by the previously united radius. But still another cause, I think, may be found in the fact that in the last operation, besides the holes bored for the reception of the wire, I made several *other* perforations with the gimlet in each fragment, a feature in the operation which I should be careful not to omit in another case.

I am aware that the *wire* has been used before in treating ununited fracture; but, as far as I know, it has been to *secure coaptation of resected bones*, as in Rodgers's case (N. Y. Hospital), and Brainerd's case (*Am. Journ. Med. Sciences*). In the latter case the wire *embraced the circumference* of the broken shaft, and in both *resection* was the operation, and the wire was used as an auxiliary.

If it shall be found that the dangers and deformity of resection can be avoided, and that the *metallic wire* alone, through its instrumentality in procuring apposition of separate fragments, but more particularly in its peculiar property of exciting *adhesive inflammation* in living tissues, is the safer and surer means, it will not be one of the least of modern improvements in surgery.

In concluding, I take pleasure in referring to the valuable assistance received, in treating the above case, from Prof. Woodward, of Castleton; Dr. Griswold, of this town; also Dr. Page, brother-in-law of the patient, to whose immediate and constant supervision of the case the success is in a great measure, undoubtedly, due.

RUTLAND, VT., May 23, 1859.

ART. VIII.—*The Uterine Dilator.* By HORATIO R. STORER, M.D.

IN January last I took occasion through the pages of this Journal to call the attention of the profession to various incidental questions connected with artificial dilatation of the uterus.

At that time the only means known of directly attaining this end was by the use of expansible tents. I make this statement advisedly; for the elastic bougies of McIntosh and the unyielding ones of Simpson, the spring knife of the latter, the hollow tubes used by Wakley for urethral stricture and adopted from him by Baker Brown, and the instruments of Drs. Graham Weir and Rigby with expanding metallic blades, have all of them proved inefficacious or hazardous. The first two on the list are slight in their immediate action and excessively wearisome to both operator and patient; those subsequently mentioned are often difficult to use and at times still more so to control. Where there are cutting blades there is danger of hemorrhage, and where the divisions of the instrument act only by pressure it falls unequally and not upon the whole circumference of the cervical canal.

It is with pleasure, therefore, that I proceed to announce an additional method of dilating the uterus, far more controllable, effectual, and reliable in its action, so far as I am aware new in its application to this organ, capable of being applied to its body as well as to the cervix, and probably destined to effect a complete revolution in the treatment of many forms of obstetric disease.

There are various objections to the use of expansible tents for dilatation of the uterus, of whatever material they may be made. These objections are so decided in the case of sponge, that for nearly five years I have been engaged in a series of experiments, having for their sole object the discovery of an available substitute.

Early in 1855, in a paper read before the Medico-Chirurgical Society of Edinburgh, and reported in the *Association Medical Journal of London*,[1] I proposed the use of mucilaginous tents, and suggested for this purpose the inner bark of our native slippery elm (*ulmus fulva*).

Several months later, allusion was again made to the necessity of a safer and more controllable agent for dilating the uterus than sponge.[2]

In November of the same year I published a paper upon the subject in the *Boston Med. and Surg. Journal*,[3] stating, as I had previously done, my dissatisfaction with the agent then proposed, except for cases, like

[1] May, 1855, p. 446.

[2] Preface to Simpson's Obstetric Memoirs and Contributions, Sept., 1855.

[3] Nov., 1855.

mechanical dysmenorrhœa, requiring a comparatively small amount of dilatation.

The article of January last, to which I have already alluded, again pointed out the importance of this inquiry.

Though the earlier of these communications, which were based upon experiments with other mucilaginous agents than elm, were quoted at some length in several foreign journals[1] besides that in which the first appeared, an English physician, Dr. Aveling, of Sheffield, has lately renewed the proposal of mucilaginous tents,[2] apparently ignorant that in this he had been anticipated by over three years. Gentian root, however, the substance he recommends, is among the agents I had previously made use of, and had thrown aside as comparatively worthless. The root of the officinal gentian, as is well known, contains scarcely a trace of mucilage; the spurious root, ranunculus thora, often sold for the gentian,[3] and undoubtedly referred to by Aveling, affords a larger percentage, but is greatly inferior in this respect to elm.

The uterine dilator now presented to the profession acts by fluid pressure, and is a modification of an instrument suggested for the female urethra by Spencer Wells, of London,[4] which in its turn was taken from the dilator for urethral stricture invented by Arnott and further modified by Thompson. It is a curious fact in the history of the various means thus far proposed for dilatation of the uterus that they have all without exception been based, directly or indirectly, upon some method previously in use for the treatment of strictures of the male urethra.

The instrument consists essentially of three portions: a distensible sac, the dilating medium—a hollow staff, for support and as a channel of communication to and from the aforesaid sac—and an external source of supply. By the aid of the staff, the sac is introduced undistended into the cavity of the cervix or of the uterus itself as may be desired, and by its enlargement any amount of dilatation may at once be effected.

In Mr. Wells' apparatus, the first of the portions described consisted of rubber tubing; and the third, of a common syringe.

Against rubber, however, even when vulcanized, there are objections for all purposes requiring its exposure to the fluids of the vagina. It is apt to be chemically acted upon by these, to become offensive, and from absorption of the products of its decomposition there is danger of pelvic cellulitis. It is also necessarily somewhat bulky; the thinnest qualities being liable to tear if exposed to any considerable amount of distending force, especially if increased by external pressure. I have, therefore, supplied its place by

[1] Glasgow Med. Journal, April, 1856, p. 116; Braithwaite's Retrospect, January, 1857, p. 247, &c.

[2] Med. Times and Gazette, June, 1858, p. 653.

[3] Griffith, Med. Botany, p. 461.

[4] Med. Times and Gazette, July, 1858, p. 84; with wood-cut.

gold-beater's skin, and in practice have found the membranous sheaths sold for the prevention of pregnancy to be admirably adapted for the purpose; an end certainly much better than that to which they are usually applied.

The staff, if the uterus is unimpregnated, should be of silver; a hollow tube of sufficient length, some ten inches, to enable it to project externally, of an internal diameter varying with the case, and perforated laterally at its further extremity. In these respects a male catheter might suffice, were it not that the curve must be extremely slight, to correspond with the axes of the female pelvis.

Where the uterus is displaced, unless it is immovably fixed by adhesions or by the pressure of some morbid growth, the same curve may be used, provided that, if necessary, the organ has been reduced by the sound; if this cannot be done, a curve especially adapted to the displacement may be required.

In pregnancy, however, where the dilatation is for the purpose of inducing premature labour, the tube should be of larger size than would otherwise be necessary, or it should be flattened, to guard against laceration or a pressure too sharply defined. Near the close of gestation, when the cervix is nearly effaced, the tube, if circular, should be at least the sixth of an inch in diameter. The employment here of the ordinary flexible catheter, gum elastic, will generally be found preferable; as this, by means of its wire stylet, can be made to assume any desired curve during introduction. After the wire has been withdrawn, the flexible staff occupies so little space and is so yielding that it can occasion no injury to either mother or child.

For the ordinary syringe I have substituted the elastic pump of Higginson, as preferable in every respect. When attached, it forms with the remainder of the instrument a continuous tube; there is no unnecessary manipulation of the stopcock when the pump is in action, nor is there the liability of injecting with the fluid a quantity of air, which in case of the rupture of the sac might give rise to a serious result.[1]

For uterine dilatation a different mode of attaching the sac to its staff is necessary than in treating stricture of the urethra. A movable ring, bevelled on the edges and conformable in its position to any given case, is applied to the circumference of the staff. It should consist of gutta percha, which best answers the various indications, perfectly retaining its position without being too unyielding; yet easily moved whenever required, after softening by hot water. The sac having been slipped over the staff, it is fastened to it and confined within any desired limits by a pair of ligatures, the one above and the other below the ring just described; a third ligature is applied more externally, to confine the otherwise loose outer extremity of the membranous sheath.

[1] Reid, Physiological, Anatomical, and Pathological Researches, p. 578. Simpson, loc. cit., i. p. 719; ii. p. 73.

To the upper end of the staff a flexible tube is attached, of sufficient length, by extending beyond the bedclothes, to prevent any exposure of the patient, and fitted with a stopcock, by which the amount of pressure can be regulated at will. To the outer portion of this stopcock the pump is joined by a small rubber coupling, which readily permits its removal.

For the dilating agent a liquid is essential; it should be slightly warmed, lest too sudden a shock be communicated to the mother or fœtus; its temperature, however, soon becomes raised to that of the blood. The presence of air should be carefully guarded against, for the reason already given, sudden death having followed its introduction into the uterine sinuses; air has, indeed, been proposed in a French journal as a dilating agent for the os; but for this purpose its use is not only of doubtful feasibility,[1] but unjustifiable.

Previously to introduction the sac should be thoroughly discharged of air by reversing the ends of the pump, then well lubricated and wound smoothly about the extremity of the staff. As it becomes distended it successively assumes a fusiform and globular shape, while the further it is introduced the more readily it will retain itself within the uterine passages.

I will now proceed to relate a case, so far as I am aware the first instance in which fluid pressure, as such, has been employed for artificial dilatation of the uterus. The instance of the uterine douche, to excite premature labour, cannot be alleged in contravention of the above statement. That method, as usually applied, is confined to the vagina, producing its effect of relaxing and opening the cervix wholly indirectly, by reflex action, or if also by upward pressure, yet to a limited extent; Kiwisch, indeed, thought that the relaxation was merely in consequence of absorption of the injected fluid. In the rarer cases, where the stream of the douche is actually thrown into the uterus, the intention has been to produce detachment of the membranes, and thus alone does this method act; most of the fluid being immediately discharged again by the simple tonic pressure of the uterine walls. Similar reasoning applies to the ingenious combination by Graham Wier of the two plans of Hamilton and Kiwisch—its action being merely to the same end, "separating the membranes to some distance from the vicinity of the os;"[2] while the caoutchouc bottles that have also been used seem always to have been placed in the vagina, and to have acted merely reflexively. They cannot, therefore, be considered in the light of a direct uterine dilator.

Distension of a retained placenta by injections of water through the funis, as in a case of my own at the Boston Lying-in Hospital,[3] might seem somewhat analogous to the method now proposed, but it is not in any respect.

[1] Gardner, On Sterility, p. 148.

[2] Edinburgh Med. and Surg. Journal, April, 1855; "Case Book," p. 40.

[3] Boston Med. and Surg. Journal; Lying-in Hospital Reports, 1855.

CASE. Mrs. N——, aged 31, of West Roxbury, a healthy and robust woman of middle height, came under my charge, March 17, 1857; then in labour at the full time.

On inquiry, I found that she had previously been confined thrice, and that on each occasion the child had been removed by craniotomy.

Upon examination, the os proved fully dilated and the presentation normal; but the head had not yet entered the pelvic brim, though the labour had been present for many hours. After further waiting, no advance having been made, the long forceps were applied, but without avail. Complete anæsthesia was now produced, and the child turned; delivery of the trunk was effected, but no efforts were able to release the head, and it eventually became necessary to lessen it by perforation beneath the chin.

Although the patient was cautioned against a recurrence of pregnancy, she presented herself at my office in the latter part of November, 1858, again over three months gone; to choose between premature labour and the Cæsarean section.

On April 13, 1859, with the assistance of my friend, Dr. Nathan Hayward, of Roxbury, who was also with me in her former confinement, I commenced the induction of premature labour; somewhat over eight months having elapsed since the last catamenia, and the capacity of the pelvis having been increased as far as possible by mild cathartics and a sparing diet.

Upon examination, the os was found elevated, situated anteriorly, and the cervix almost entirely effaced. After careful exploration with the double stethoscope, it was decided that the placenta was attached to the left of the fundus uteri, and a little posteriorly.

9.30 P. M. The instrument above described was now introduced within and above the os, and the sac, previously adjusted to the size of a pigeon's egg, was inflated. No sensation of pain.

10.30 P. M. Instrument easily withdrawn; still distended to the full extent, the os having been correspondingly dilated. Upon being reintroduced, the size of the sac was doubled, and the patient then left for the night.

April 14, 8 A. M. Has had a comfortable night. Pulse 84; skin cool and moist. The instrument was again withdrawn, fully distended; by measurement the sac being $3\frac{1}{2}$ inches in length by 2 inches and 4 lines in breadth. The diameters of the sac were now still further increased. As yet no pain. Fœtal circulation unaffected.

11.30 A. M. Pulse 96. The sac was found partly protruded into the vagina, but still distended. Upon its reintroduction, slight uterine contractions were observed.

12 M. Pains distant, but somewhat increased in severity. It was discovered, on allowing the sac to drain itself under the normal pressure of the uterus, that a pain could be almost instantaneously excited by refilling it, as was also the case upon its sudden discharge. During one of these experiments the sac was burst under the compression of a pain, and a new membrane was substituted.

2 P. M. Bowels cleared by an enema. Pulse 100. A slight sanguineous show upon withdrawing instrument, which was, however, reintroduced. Fœtal circulation unaffected. At no time has the sac afforded any offensive odour.

15*th*, 3 A. M. Patient awakened by the occurrence of smart uterine contractions, by which the dilator was expelled into the vagina. From this moment the labour regularly progressed; chloroform being administered during the pains.

8 A. M. Os fully dilated. Presentation footling, as had been hoped.

9 A. M. Membranes artificially ruptured; and with consecutively recurring pains the knees, breech, shoulders, and head were with difficulty delivered.

The child, a boy, lived for two hours after birth, and was lost in consequence of the compression to which it had been subjected while passing the pelvic brim. The effect of this compression was evidenced at the time by excessive and convulsive fœtal movements. The fœtus was 19½ inches in length, and its cranium 4 inches in lateral diameter.

Hemorrhage subsequent to delivery had always been excessive, and was so now; but the patient's recovery has been better than ever before.

In reviewing the above case, several points are noticeable; the unusual elevation of the os, into which a tent could only have been introduced with difficulty, the rapidity of dilatation, the freedom of the sac from offensive odour when withdrawn, the absence of discomfort to the patient, and the fact that exosmotic transudation of the fluid and consequent emptying of the sac did not take place. It would have been preferable that the trial case had been with a pelvis free from deformity, as the labour, though here but six hours, might then have been shorter, and the results of the treatment proportionately more striking.

I am satisfied, however, that the method is an excellent one, and that for the induction of premature labour, it approaches nearer than any other to the character of the normal process at the full period of pregnancy. It is equally well adapted for cases of rigidity of the os uteri, of premature rupture of the membranes, and for all complications where it is desirable to produce immediate dilatation and the completion of the first stage of labour.

Upon being introduced within the pregnant uterus and distended, the sac acts in a threefold manner; reflexively, as a foreign body—reflexively and directly, by separating the membranes from the uterine walls—and directly as a fluid wedge, by dilating the os; in each of these three respects, the effect of our being in proportion to the amount of distension applied. The dilatation, it should be noticed, is here *from above downwards*, while the tent dilates from below upwards.

In the case that I have reported it was noticed that, by suddenly evacuating the sac, uterine contractions were at once occasioned, just as frequently occurs upon puncturing the fœtal membranes; and that after a certain period they were also determined by rapidly refilling the sac, or by increasing the amount of distending force. The possibility of a greater or less degree of distension affords all the advantages, without the drawbacks, of a successive gradation of expansible tents; while, after the sac has been introduced above the os and filled, it cannot possibly be discharged or withdrawn, unless intentionally, until the requisite amount of dilatation has been effected. The sac is of course liable to laceration under great distension or during a pain; but this accident can with care almost certainly be prevented.

Being introduced by the staff, the position of the instrument, anteriorly, posteriorly, or laterally, in relation to the fœtal membranes, can also be determined as perfectly as where labour is induced by their detachment with the sound or bougie; a matter of no small importance.

Upon presenting the central mass of the elastic pump to the stethoscope, the continuity of the column of water remaining unbroken by the stopcock, I am quite confident that the sounds of the fœtal heart were rendered much more distinctly audible. This experiment is an interesting one, and in cases of premature labour may be made productive of a practical result. My friend, Dr. Keiller, of Edinburgh, has proposed a curved vaginal stethoscope, which, however, it is difficult at an early period of labour to bring in direct contact with the bag of amniotic liquid. The fluid column now described is but a further development of the same principle.

The indications for dilating the uterus where pregnancy does not exist, I have already adverted to in my previous papers. This instrument will be found of advantage in all cases where any other form of dilator can be introduced—if, indeed, the canal of the cervix is at all pervious. Should, however, complete occlusion exist, whether congenital or resulting from adhesive inflammation following injuries during labour, attempts at criminal abortion, amputation of the cervix, the improper employment of caustics, &c., its use should be preceded by a perforating trocar. In all other cases of cervical occlusion requiring treatment for dysmenorrhœal symptoms or to assist impregnation, the dilator will be found to avail; such are spasmodic constriction, general or polypoid congestion of the mucous membrane, hypertrophy and induration of the cervical tissue. If occlusion is caused by an uterine flexion, the case is one for the sound and stem pessary rather than for dilatation, unless the pressure shall have also organically narrowed the uterine canal. Other diseases of the neck of the uterus to which treatment by the dilator is applicable, vesicular polypi, uterine hemorrhoids, cervico-vesical and other fistulæ, will readily suggest themselves to the practitioner.

In affections involving the body of the womb, the need of an efficient dilator is no less evident, and I have no question that this instrument may be readily used in some forms of uterine disease hitherto considered beyond our aid. Congenital atrophy, for instance, and that other variety resulting from super-involution after delivery, to which the application of mere mechanical irritation by the sound or a galvanic stem pessary has thus far alone been possible, are both cases in point.

In the reduction of chronic inversion the dilator is also indicated; and for both diagnosis and treatment in all affections of the uterine cavity—fibrous and other tumours, whether intra-mural, sessile, or pediculated, carcinomatous disease, moles, hydatids, &c.; but the consideration of these points, illustrated by experimental cases, I shall reserve till a future period.

BLUE HILL, MILTON (NEAR BOSTON), May 16.

ART. IX.—*Observations upon the Relations existing between Food and the Capabilities of Men to resist Low Temperatures.* By ISAAC J. HAYES, M. D., late Surgeon to the Second U. S. Grinnell Arctic Expedition. Read before the Academy of Natural Sciences, Biological Department, April 18, 1859. Recommended for publication April 26, 1859.

DURING the late cruise of the Advance to the Arctic Seas, my attention was directed to some facts in relation to the capabilities of men to resist low temperatures, which, at the friendly suggestion of Dr. Hammond, I have grouped together. With the permission of the Department, I will submit what I have written, prefacing it with the single remark that I have confined myself chiefly to what has fallen under my own immediate personal observation.

There is a great misapprehension existing in the popular mind upon the subject of Arctic life. It is, I believe, pretty generally thought that Arctic travellers are necessarily subjected to great hardship, in consequence of the lowness of the atmospheric temperature, and that almost superhuman powers are required to resist it. This is, I can but think, a great mistake. The animal economy, everywhere, adapts itself with greater or less facility to surrounding circumstances, and this power of adaptation is nowhere more strikingly exhibited than in the Arctic regions. The appetite and the digestive powers are, doubtless, more intimately concerned than any other of the animal functions, and, in the quantity and quality of the food consumed, we are led to look for an explanation of the cause which enables the inhabitants of Arctic countries so successfully to resist the cold.

During the stay of the Advance at Renssellaer Harbor, in 1853, '54, and '55, on the western coast of Greenland, in latitude 78° 37′, we had frequent intercourse with a tribe of wandering Esquimaux, numbering in all about one hundred and fifty souls, inhabiting the shores of the head waters of Baffin's Bay, from Cape York to the mouth of Smith's Strait. These people live mainly without fire. The land being destitute of wood, and none being drifted to them from the sea, they had no means of creating an artificial temperature except with a small lamp—merely a stone dish—with blubber for fuel and moss for wick. The flame of this lamp gives very little heat, and is barely sufficient to melt from the snow the water which they require, and to light their hut during the dark period of winter. These huts are often built of snow. Their permanent habitations are, however, constructed of stones and moss, and are about ten feet in diameter, by from five and a half to six in height. But these huts they are compelled to abandon during midsummer and midwinter; in midsummer, in consequence of the snow melting and pouring down through the roof; in winter, by reason of the ice belt along the land becoming so tho-

roughly solidified and widened as to render it inconvenient for them to reach the open water to the westward, upon which they are dependent for their food. In summer they live in seal skin tents pitched near the landing places of the Auk (*Wora Allar*). During midwinter they live in the before-mentioned snow houses. These houses are constructed of cubical blocks cut from a hard drift, and are from six to ten feet in diameter, and from five to seven feet high. They are placed either on a point of land projecting far out into the sea, or on the ice, near the open cracks. The walls of the hut vary from six inches to a foot in thickness; the cracks between the blocks are carefully filled with loose snow, and the entrance through a curved passage is closed on the inside by a large block of snow or a piece of bear skin. In one corner is placed such a lamp as I have already described. One-half of the floor of the hut is raised about a foot, on which they spread bear and seal skins. This serves them both as bed and sitting place.

The temperature of their huts ranges from zero to the freezing point, and is kept thus elevated, mainly by the heat radiated from the persons of the occupants; yet, with this seemingly unendurable temperature, they appear to live in comfort; the women performing all the necessary household duties, such as sewing, preparing skins for clothing, &c.; the men in making and repairing their implements for hunting. The outside temperature varies from thirty to seventy degrees below zero. No matter how low the temperature, provided the air is calm, they do not hesitate to shift their quarters as occasion may require, and with their families and domestic furniture upon their sleds they travel sometimes forty or fifty miles at a single march before meeting a favourable place for building another hut.

From these huts the men roam over the ice fields with their dog sledges in wild pursuit of the bear, or, slightly protected by a snow wall partly closing around them, they watch at the open cracks for the walrus and narwhal, or for the seal at their little blow holes. After being absent for days together, seeking rest and shelter by throwing themselves upon a piece of bear skin upon the ice, or if blowing in a temporary snow hut. Their clothing at this period consists of a bird skin shirt, bear skin pantaloons, boots, and mittens, dog or bird skin stockings, and a fox skin coat, with an attached hood covering the head. This coat is always taken off when entering the hut.

My object in dwelling thus minutely upon the habits of this people you will readily appreciate. Living virtually without fire, most meagrely dressed, dependent at the same time upon the hunt for every necessary of life, and almost daily exposed, in the pursuit of game, to the very lowest temperature, we are astonished at their complete indifference to the cold; not only do they seem indifferent to it so far as concerns their physical comfort, but they are able to resist all of its depressing influences. They are a strong, robust, and healthy race. Scurvy is unknown amongst them, and I have never known or heard of an instance of tubercular disease.

I think you will agree with me in what was stated in the outset, namely, that we must look for an explanation of this wonderful power of resistance in the quality and quantity of the food consumed. They subsist entirely upon animal food; the flesh, mainly, of the walrus, seal, narwhal, and bear, and the quantity which they eat seems really enormous. I have frequently seen an Esquimaux hunter, when preparing for the hunt, eat from six to twelve pounds of meat, about one-third of which was fat, and I should place the daily consumption of the men at from twelve to fifteen pounds; and, in this large consumption, they find their shield against the cold. This food is mostly taken raw, and in their long journeys they stop from time to time, unlash their sledges, and cutting off strips of frozen blubber eat them with apparent relish. I do not believe that they could live upon a vegetable diet.

The same laws govern the Esquimaux and white men, and just in proportion as we of the Advance accustomed ourselves to the diet of the Esquimaux did we gain power to expose ourselves with impunity to low temperatures. We found ourselves continually craving animal food, and especially fatty substances, which, to us in these latitudes, would be exceedingly distasteful. Frozen blubber became quite palatable, and during the second winter, when the temperature of the cabin was rarely above 45°, and often as low as zero, it was found necessary by Dr. Kane, in order to protect his men against the bad effects of the salt, to guard the slush barrels by the strictest orders.

The process of acclimation with us was gradual. I remember well how, in the autumn of 1853, we suffered intensely from temperatures which a year later produced no impression whatever upon us, and I am satisfied that this increased power of resistance was in direct proportion to our ability to eat and digest animal food. During a later period of the cruise, some of the party lived precisely the life of the Esquimaux during three winter months, entirely without fire for purposes of warmth, without suffering any serious inconvenience or discomfort from the low temperatures.

It is worthy of more than the mere passing remark, that the climate is one of unusual healthfulness, and that scurvy and phthisis are unknown among the natives. In relation to the last mentioned disease, I give the fact without comment or opinion; with regard to the former, I will remark that whenever it has occurred in vessels visiting the Arctic seas it has been mainly owing to accidental causes which experience has taught us to avoid. These are: salt food, cold, and the darkness of the long winter night, with the depressing, moral, and physical influences which it carries in its train, and, as an occasional exasperating cause, excessive exertion.

For the use of a salt diet there is now no necessity, and if we bear in mind the fact that whenever the crews of vessels wintering in the Arctic seas have been attacked with scurvy, they have subsisted invariably upon such a diet, we will at once perceive how all the above mentioned causes of

its development operate together to produce disease. In the first place, the salt meat is injurious in itself, and will not, in any climate, sustain the human body in health; and, in the second place, if it could be taken with impunity, so far as the salt is concerned, a sufficient quantity of it could not be eaten or digested to enable the system to ward off the depressing influences of the cold and the darkness. With a good and unlimited supply of rich fresh animal food, these last mentioned causes either have no actual existence, or are easily avoided. The cold only becomes a predisposing cause of disease, when the vital forces are not sustained by proper alimentation. The same may be said of the darkness, although there is, doubtless, a cause independently operating upon man as upon plants placed under similar circumstances; yet rich food, plenty of water, exercise, good ventilation even at the expense of temperature, and last but not least, a healthy, cheerful tone, will, in every case, counteract the ill effects of the long-continued darkness.

A most singular effect of the use of salt food was observed among the dogs. These animals had never been accustomed to such a diet. They could not eat it except in small quantities, and the salt of the meat, the cold and darkness, operating together upon their feeble bodies, developed a singular *epilepto-tetanoidal* disease, which ultimately destroyed nearly every animal which Dr. Kane took with him from Southern Greenland, or afterwards procured from the natives of Smith's Strait. The same was, from time to time, observable among the men, and, doubtless, for the same reason.

I have stated that the natives for the most part eat their meat raw, and having availed myself of the knowledge of this fact to great advantage, I would suggest it to my brethren of the profession. I have frequently found that when the stomachs of very scorbutic patients refused cooked meats, that they could readily retain the uncooked flesh, if frozen, or as our men expressed it, "cooked with frost," and in this state it seemed to antagonize more immediately the scorbutic condition. The operation of freezing destroyed entirely the repulsiveness of the raw flesh, and the walrus and seal meat which was found best suited to their wants, was very generally thus preferred by the sick. They often relished it, especially if acidulated with a little vinegar or lime juice, when they could take nothing else.

While fresh animal food, and especially fat, is absolutely essential to the inhabitants and travellers in Arctic countries, alcohol is in almost any shape not only completely useless but positively injurious; and in this view I am fully sustained by the well-qualified judgment and experience of our enterprising and indefatigable friend, Dr. Rae, whom we had the pleasure, not long since, of welcoming to the Academy. So well am I convinced of this fact, that, in the expedition now organizing to the Arctic seas, I shall not only not give it habitually, but will carefully guard against taking any one with me who is addicted to its use. Circumstances may occur under which its administration seems necessary; such, for instance, as great prostration,

from long-continued exposure and exertion, or from getting wet, but then it should be avoided, if possible, for the succeeding reaction is always to be dreaded; and, if a place of safety is not near at hand, the immediate danger is only temporarily guarded against, and becomes, finally, greatly augmented by reason of decreased vitality. If given at all, it should be in very small quantities frequently repeated, and continued until a place of safety is reached. I have known most unpleasant consequences to result from the injudicious use of whiskey for the purpose of temporary stimulation, and have also known strong able-bodied men to have become utterly incapable of resisting cold in consequence of the long-continued use of alcoholic drinks. I do not believe that it has a single useful property, not possessed in a ten-fold degree by other stimulants, and under this head I rank tea and coffee. So valuable are both of these that I am at a loss to say which is best. The English Arctic explorers almost invariably use tea, and so do the Russians; but Dr. Kane's parties, after repeated trial, took most kindly to coffee in the morning and tea in the evening. The coffee seemed to last through the day, and the men seemed to grow hungry less rapidly after taking it than after drinking tea, while tea soothed them after a day's hard labour, and the better enabled them to sleep. They both operated upon fatigued and over-tasked men like a charm, and their superiority over alcoholic stimulants was very marked. The virtue of coffee used under the above-mentioned circumstances I cannot over-praise, the only drawback to its frequent administration being the difficulty of preparing it, when the atmospheric temperature is low and the traveller is obliged to depend upon a lamp with which to melt and boil his water.

These facts I submit with comment, leaving for those better qualified to determine whether they throw any new light upon the highly interesting and important physiological questions which they involve.

ART. X.—*On Sunstroke.* By A. P. MERRILL, M. D., of Memphis.

THE remarks on sunstroke in the No. of this Journal for January last, by Dr. Levick, possess much interest to those who have had their trials with this formidable disease. He shows a similarity in the pathology of this and some other diseases with which it has often, no doubt, been confounded. Doubt appears to exist whether sunstroke be primarily a disease of the blood, of the vascular, or of the nervous system. The morbid qualities of the blood—*post-mortem*—are said to be such as exist in cases of death from other causes suddenly paralyzing the nervous system, such as a stroke of lightning. That the vascular system is embarrassed by local congestions appears to be conceded, but it would be difficult to show that this

is a primary condition. It would seem more probable, on the contrary, that the nervous system feels the first impulse from the acting cause, and every sensation of the patient indicates disordered innervation in the first instance, not unlike that which occurs in the cold stage of fever; and the subsequent reaction in cases of recovery, and the *post-mortem* appearances of those who die, are sufficiently like those of fever to justify a belief in a unity of effect. The influence of certain remedial agents, also, corroborates this view.

It is sufficiently evident in attacks of fever of violent grade, that the nervous energies are prostrated, causing congestion, and it has been sufficiently proved that relief may be obtained in this early stage of the disease by the use of those remedies which act most directly upon the nervous system. Thus opium, and, indeed, the whole tribe of narcotic plants, have been successfully used in the first stage of fever. And, perhaps, it is no disparagement to this view of the pathology of fever, that it has also been treated successfully, in this early stage, by both bloodletting and cold bathing; proving that the condition is not one of debility, but of temporary depression of vital power, causing stasis of blood. Although bloodletting and cold may, by their sedative power, hasten reaction, and thus afford relief to local congestions which threaten to extinguish life, they must always be considered hazardous remedies, because, if applied too suddenly and extensively, their tendency is to cause further depression of vital power, and produce death without reaction; and it is this danger, I apprehend, which has brought these remedies into disrepute in such cases.

That sunstroke is a disease of this nervous character I have long been persuaded, not only from the symptoms, but from the action of remedial agents; and the suddenly fatal effects produced by drinking cold water while the system is heated by exercise, appears to me to depend upon the same pathological condition. Opium, bloodletting, and cold bathing, have all been successfully used in these affections by many physicians, and by as many, perhaps, unsuccessfully; showing, perhaps, that the difference depends upon time, and manner, rather than upon a want of adaptation. But I think we have a remedy in chloroform, far superior to any or all these, for this dangerous condition of the system. It has the advantage, too, of being free from the objections to opium, on account of any subsequent influence upon the cerebral and digestive organs. It has also the advantage, in cases of insensibility, of being more easily administered. Pure chloroform poured into the mouth of a patient suffering from great prostration excites the organs of deglutition to action when nothing else will. My practice has been to give it in doses of a fluidrachm, and repeat it as occasion required; but my experience has not been sufficient to determine its true value in such affections, or the proper method of administration. These points can only be settled by more extended observations, and it is with a view to secure these that this paper is written.

ART. XI.—*Silver Ligatures and Sutures in a case of Amputation of the Mammary Gland.* By THOS. ADDIS EMMET, M. D., Assistant Surgeon to the Woman's Hospital. New York.

Mrs. Brenon, aged 31, of healthy parents, was admitted to the Woman's Hospital Feb. 17, 1859, with scirrhus of the breast.

She was below the average height, and by no means robust in appearance, with a slight figure, pale complexion, light brown hair, and blue eyes. The internal organs were found in a healthy condition. An examination presented a hard, irregular mass, occupying nearly the entire left breast, free from adhesions, and more extended to the left of a partially retracted nipple. There was no enlargement of the glands in the axilla, and the tumour was without pain except when bruised, or from its own weight when unsupported.

She was the mother of seven children, and at the time of admission was advanced nearly five months with her eighth pregnancy. The catamenia appeared for the first time just before marriage at 16 years of age. As an interesting fact, she stated that during the past nine years and a half, she had menstruated but once, being pregnant or nursing during the whole period. From childhood she continued in good health until the reception of an injury, some two years since. While reaching out of a window, she lost her balance, and in recovering herself she felt something rupture in the gland—or snap, as she expressed it. She became faint and suffered exceedingly from pain for a short time. Much inflammation and enlargement followed; her physician, supposing it to be an abscess, lanced it, but only a few drops of blood escaped. The enlargement subsided after some five weeks, and she then noticed for the first time a movable lump about the size of a filbert, to the left of the nipple. Only while in the act of nursing (from throbbing and shooting pains towards the axilla) did she experience any inconvenience, and the size remained stationary. She was obliged to wean her child, which had been previously healthy, but had not thrived since the reception of the injury. The seventh pregnancy resulted almost immediately afterwards, and no increase in size took place during either gestation or the following lactation. The eighth pregnancy occurred in November last, and she still continued to nurse her child (which had been delicate from birth) until the latter end of December, when it died. On ceasing to nurse, the tumour rapidly enlarged, and was a constant source of pain from the slightest injury. The patient was exceedingly anxious for its removal, but in consequence of her pregnancy, it was a question in consultation whether the operation was justifiable until other means had been resorted to. She was placed on a tonic and alterative course of treatment, with a good diet. As the attention of the profession had been recently drawn to the use of compressed sponge in such cases (by Dr. Batchelder before the Academy of Medicine[1]) this was deemed a fair one to test its merits. On the day after admission, a compressed sponge (rather larger than the tumour) was bound into place by a bandage, and through an opening made, water in small quantities was injected, so as to produce its gradual expansion. After a few days it was noticed that rapid absorption of the cellular tissue was taking place, while the tumour apparently was increasing in size, and nearer the surface. A fresh sponge being daily substituted, this continued pressure was persevered in for nineteen

[1] Also see May No. of the New York Journal of Medicine.

days, and anodynes were freely used. At the end of this time, there scarcely remained tissue enough for a flap from adhesion of the integument to the tumour, and the glands in the axilla were enlarged. The patient's general condition was much lowered, in consequence of constitutional irritation resulting from pain by pressure.

After a few days' rest, on the 10th of March last (at half past two, P. M.) the patient was placed under the influence of chloroform, and the whole gland was removed in the presence of Drs. Mott, Sims, Mott, Francis, Scudder, and others. It was deemed advisable to leave the removal of the axillary glands for a subsequent operation if necessary, for their enlargement was regarded as resulting from the use of the compressed sponge. The incisions were made more transverse to the body and not towards the axilla, as is the usual operation. This was done to allow of perfect drainage in the recumbent position, in case of slight hemorrhage or formation of pus. The vessels were found unusually large both in size and number, and eleven were secured by means of fine silver wire. An artery being elevated on a tenaculum, the wire was passed around, and with an end held in each hand, they were then crossed and drawn tight, the first turn in the twist being made close to the vessel. The ligatures were then cut off as short as was deemed secure, and left to become encysted. Although simply twisting the ends of the wire is the usual mode adopted in any operation, the attempt here was first made to tie the ligature around the vessel, but failed, in consequence of more force being required to form a compact knot than the strength of the wire would admit of. Contrary to direction, the patient had taken a hearty meal before the operation, and vomited freely. From this delay, and fearful of hemorrhage, she was continued partially under the influence of chloroform for nearly an hour before the wound was finally closed. This was effected by a continuous whip stitch of silver wire, each over turn being passed through about half an inch from the edges and within a quarter of an inch of its fellow. The needle used was a short, straight one, directly armed, and as each over turn was made, the edges were drawn permanently in contact. The passage of the needle was much facilitated by using a blunt hook or tenaculum held on its flat side near the exit, as a point of resistance. By Dr. Sims' advice, this form was adopted as bringing the edges in contact throughout with greater accuracy than could be obtained by a succession of interrupted sutures. The further progress of the case showed that its success resulted in a great measure from this method, as it prevented unequal traction at any one point. It was more tedious, but answered admirably the end in view, leaving a continuous line of apposition. The wound thus closed was nine inches and a third in length. No adhesive plaster or any other dressing was used, except a wet compress retained by a bandage loosely applied. With the accelerated pulse after the use of chloroform, her condition remained comfortable until midnight, when slight rigors came on followed by fever. As the ward was crowded and very warm, she was moved to another room without fire. Complaining of pressure, the bandage was removed, and an enema of beef tea, with two drachms of tinct. opii was ordered. About three o'clock, A. M., with a pulse of 107, fluctuation was detected at the lower angle of the wound. Several turns of the suture at this point were divided, and the already adherent edges separated with a probe; about an ounce of blood (extravasated likely by moving her after the operation) thus escaped.

March 11th. 9 o'clock A. M.—Pulse 120; skin warm; ordered liq. am. acet.; spts. am. aromat., and morph. acet. in combination, together with beef tea. At three P. M., pulse 100, and condition more comfortable.

12*th*. 9 o'clock A. M., had a good night, pulse 100. Continued the same treatment. No change at 3 o'clock P. M. Separated the edges of the dependent angle, and allowed two or three drachms of thin bloody pus to escape. Continued the water dressing.

14*th*. Pulse natural. Introduced a tent into the lower angle, for the purpose of keeping it open, and directed the same to be removed several times a day. Union had taken place nearly throughout, and a probe could not be passed for any distance under either flap without breaking up adhesions. Ordered tinct. ferri chloridi gtt. xv three times a day, with lager beer.

16*th*. The patient was anxious to get up, and could not understand the necessity for keeping the arm on that side at rest.

18*th*. Found the suture midway, partially torn out from the upper flap. As the line of union at this point was nearly at a right angle to the fibres of the pectoralis major muscle, every movement of the arm from the side placed the parts on the stretch, as soon as adhesion began to its surface. It was also at the point of greatest deviation in the lines of incision, and where, consequently, the most traction was exercised in bringing the two edges together. There was no cutting out by progressive absorption, as in a silk ligature, but the result of violence, and it is doubtful if one, however large, would have answered better, although the wire in use was of the smallest size.

21*st*. Stopped all dressing; the patient sat up through the day, it being the eleventh since the operation. Several short strips of adhesive plaster were used as a means of precaution, although the edges of the fissure were not more than a line apart in the centre, and less than an inch and a quarter in length.

25*th*. The line of separation had not increased; the fissure was nearly healed by granulation, and the union complete at every other point. The patient's general health and condition was most decidedly improved.

April 1. No further local treatment was deemed necessary, but continued the use of tonics.

11*th*. Was discharged from the hospital, having been retained to watch the effects of the suture. No irritation resulting, as an experiment it was decided to let it remain until after delivery.

23*d*. Returned to have the suture removed, as a number of the loops (on a return of the parts to health) were left prominent, and caused inconvenience and pain, from the pressure and friction of her clothes. This was done on the forty-third day after their introduction. With a most careful examination it was impossible to detect the position of a single ligature; they had become encysted, and the future must determine if they will remain so.

The advantages of silver wire, as claimed by Dr. Sims for its introduction in general surgery, presented in this case all that could be asked for. It hardly admits of question, if the same result (under similar circumstances) could have been obtained by the use of silk. By thus securing the vessels and closing the wound, union by the first intention was obtained nearly throughout. The slight oozing of pus for several days after the operation was scarcely in any degree from irritation of the ligatures, but in consequence of the death and separation of the portion of tissue strangulated by them. As soon as the effects of the chloroform, and the shock of so serious an operation had subsided, the patient began rapidly to improve,

and continued to do so. With the drain established by the seton effect of eleven silk ligatures, and the resulting union by granulation of so large a surface, in a crowded hospital, the same result could not have been hoped for.

It is exceedingly doubtful if the edges could have been brought together by means of interrupted silk ligatures at all, and if so, they would have rapidly cut out. From the difficulty of keeping the arm at rest, until adhesion throughout had taken place to the surface of the muscle, it is questionable if a more severe test of the value of the silver suture could be presented in surgery. As a saving of time and labour to the surgeon, in the subsequent treatment of a case, no comparison exists in the use of either silk or animal ligatures. And finally, the experience of its introducer has proved, that when the wire is made from virgin silver and annealed, it is superior by possessing in common all the advantages, without any of the objections to other metallic ligatures.

Note.—June 6th. Mrs. B. has advanced to within a few days of her confinement. Perfect restoration to health has taken place and the enlargement of the axillary glands entirely subsided. The cicatricial line has contracted to six inches and a quarter in length and the parts are free from pain on pressure at any point.

73 MADISON AVENUE, N. Y.

ART. XII.—*Supposed Encephaloid Testicle; Hermaphrodism.* Communicated to the Boston Society for Medical Improvement and to the American Journal of Medical Sciences. By J. MASON WARREN, M. D. (With a wood-cut.)

THOMAS MARTIN, 21 years of age, applied to me in April, 1859, on account of a great enlargement of what appeared to be the right testicle. His external appearance was that of a young working Irishman. The beard was full, strong, and black; the larynx was of the ordinary size, and the voice masculine; the shoulders were broader than the hips; the muscles were well developed; no fat; height sixty-five inches, of which thirty-three were above the pubis, and thirty-two below.

His own history of the case was as follows: Early in life he lost, or had had removed, the left testicle, but could give no particulars of it. The right testicle was greatly enlarged, measuring thirteen inches in circumference, seven and three-quarters in length, egg shaped, and it extended nearly two-thirds of the distance from the pubis to the knee. It was excessively tense, hard, and seemed too heavy to be supposed a hydrocele, although the great evenness of its surface would seem to make such a supposition probable. Some very large veins ran over its surface under the skin. The spermatic cord seemed well defined above the tumour, though a little harder than natural. He complained of considerable pain in the back and loins, which was attributed to the dragging weight upon these parts. The pain in the

testicle itself was not excessive. The testicle had been, he says, of normal size till about a year since, when he received a severe kick upon it. After the first acute symptoms had subsided, it then commenced to swell slowly, but within the last month it had increased very rapidly. The sexual feelings and power of erection continued natural till about six weeks ago, and since then they have completely disappeared. He has never had sexual intercourse, and there is some doubt whether he ever had seminal emissions. About a month since, both breasts began to swell and become painful, and upon examination I found them to be of the size of those of a young female; the glandular structure could be distinctly felt, and the disk was about four inches in diameter. No fluid issued from them on pressure. I could not learn from him whether they had previously been larger than natural, but the present increased size seemed to have corresponded in time with the loss of sexual desire. He stated that his health was failing, he had lost his appetite, and was desirous of an operation to relieve him from suffering.

Being friendless, I advised this patient to enter the Massachusetts General Hospital, where the testicle was removed on Wednesday, April 13th, and the cord tied *en masse* near the abdominal ring, some dissection being necessary in order to reach the cord above the disease. Previous to the operation, he had been excessively diffident about having the genital organs examined, and at this time the following appearances were first remarked. The glans penis appeared normal but imperforate; the body of the penis was from two to three inches in length. Commencing about an inch from the glans and extending to within two inches of the anus, was a fissure having on each side two flaps of delicate epithelium, exactly resembling the nymphæ, which, being separated, presented, as it were, the external organs of the female. At the lower part of this fissure commenced apparently the urethra, and an instrument being introduced about three inches, water escaped freely. External to the fissure, the skin was thin and delicate, like that in the neighbourhood of the female organs of generation. The pubis was very fully covered with hair, which was shaved to facilitate the dressing after the operation. Dr. Dyer, house-surgeon of the Hospital, at my request took a cast of the breasts, their appearance was so unusual. My inquiries would have been much more particular in regard to his previous history, and especially as to anything resembling the menstrual discharge, if I had had the slightest suspicion of the subsequent manifestations.

The day after the operation he complained a great deal of pain in the abdomen and much fever, also of thirst, which was partly attributed to the ether administered. The febrile action gradually increased from day to day, the swelling and pain in the abdomen, however, subsiding until his death, which took place on the seventh day from the operation. On the day of his death, he drank by mistake a quantity of laudanum left as an external application, and which he took for brandy, but as soon as discovered by the house-surgeon, it was evacuated from his stomach by an

effervescing dose of saläeratus and vinegar, and so far as could be perceived, produced no symptoms.

An examination of the body was made on the following day. Both lungs were found studded with large masses of cancerous matter, and were adherent at certain points to the pleuræ. The liver at first appeared healthy, but on being cut into a number of cavities were discovered about the size of a filbert, containing a thick, milky fluid. On the spine, at the root of the mesentery, was a mass of enlarged lymphatic glands, the chain of them extended down from the edge of the rim of the pelvis nearly to the groin, much flattened, and not perceptible through the walls of the abdomen. The cord in the neighbourhood of the ring, just above the spot where the ligature had been applied, was in a gangrenous condition. The intestines being removed, exposed the following remarkable appearances in the pelvic organs: The bladder was somewhat distended, and just behind it lay a well-formed uterus of natural size, as in the unimpregnated state. On the left side of the uterus the Fallopian tube terminated in its fimbriated extremity, under which lay the ovary, rather smaller than natural, and with one or two little bands of adhesion running between it and the Fallopian tube. The ovary being incised displayed its ordinary structure. On the right side, the tube ran along under the peritoneum, turned upwards, and was lost in a diseased mass in the right groin. The parts were now removed with great care from the pelvis by Professor J. B. S. Jackson, who fortunately happened to be present with his class, and assisted at the examination.

All the pelvic organs being removed and placed on a table, we proceeded to investigate the relation of the different organs. A probe was passed into the urethra, and went readily into the bladder; being withdrawn and depressed a little, it passed with equal facility to the fundus of the uterus. The parts were now turned over, and the back of the vagina and uterus laid open. The vagina which commenced about an inch from the external orifice, was nearly four inches in length, and terminated in the os uteri, which, however, did not make much of a relief in the vagina, although the distinction in the two textures was fully marked. The arbor vitæ was very distinct and beautifully shown; it extended nearly up to the fundus of the uterus. The blowpipe being introduced into the left Fallopian tube, air passed freely through it and out of the fimbriated extremity. A probe could be passed for a certain distance freely into the right Fallopian tube, but air did not pass through it as in the other.

In regard to the tumour removed, the whole substance of it seemed to be converted into encephaloid matter, and its natural structure lost. The tunica vaginalis was adherent, except at its anterior part; it was cut into early in the operation, and about a gill of yellow-coloured serum escaped, exposing on the upper part of the organ a collection of most beautifully coloured cysts of all sizes, like a mass of most brilliant crystals.

It would have been extremely interesting in this case to have decided whether menstruation had ever taken place through the urethra, but this, unfortunately, I had no means of determining.

The organs being given to Dr. Hodges, the Demonstrator of anatomy to the College, for the purpose of a more minute dissection and investigation, he has kindly furnished the following report:—

"*Pilous development* that of a male. *Penis*, which is that of an adult, and not of a youth, measures along its dorsum two and a half inches. The glans, of proportionate size, is covered, except in the immediate vicinity of where the frenum should be, by a well-developed prepuce. The urethra being cleft from the meatus backwards, the prepuce is not completed underneath, but becomes lost in the sheath of the penis.

The *urethra* is traceable, along the under surface of the penis, from the meatus $3\frac{1}{4}$ inches, and disappears in an orifice $2\frac{3}{16}$ inches in front of the anus. Throughout this distance it consists only of a fissure or sulcus, the sides of which having irregular borders are in apposition. It is lined with well characterized mucous membrane, and has at various points distinct lacunæ.

Diverging obliquely upwards and outwards from the sides of the urethra are folds of integument, constituting distinct *labia major* and *minora*. On the left, at the side of these labia, are indistinct marks of cicatrices.

Examined internally, the penis consists of two *corpora cavernosa*, measuring from the meatus to their bifurcation 4 inches. They terminate in well-marked crura, and the nerves, arteries, and veins of the dorsum of the penis have the usual size and position. The *corpus spongiosum* is well developed, but split longitudinally into two halves, which are to be seen on either side of and behind the corpora cavernosa, and correspond externally to two folds which form the labia minora.

Cowper's glands were not found.

The muscles of the perineum were somewhat confused, but the following were distinctly made out: *erectores penis*, *compressores urethræ*, *levator* and *sphincter ani;* anterior to the latter was another elliptical sphincter muscle, corresponding, probably, to the *sphincter vaginæ*. The *transversus perinei*, as such, was not made out.

The *bladder* is of ordinary size, but its muscular development is greater than usual. It has two *ureters*, normal as to their entrance and otherwise. From the internal orifice of the bladder to the "vagina urethralis" it is $1\frac{1}{4}$ inch. Laid open along its anterior surface, its neck is embraced by a bi-lobed prostate gland of about half the natural adult dimensions; posteriorly to this the neck is thickened, and the section is as through a structure resembling the prostate. On squeezing the prostate, its secretion is seen to issue through several apertures on each side of the urethra, where the prostatic sinus usually exists. There is no verumontanum, but where it should be, and where the sinus pocularis would be found, the urethra and vagina blend, and a probe inserted and passed backwards enters the vagina; passed forwards, it appears externally at the orifice in front of the anus. Behind the bladder are found the uterus and vagina. On dissecting up the bladder from the vagina, as far down as the prostate, no *vesiculæ seminales* are to be found.

The uterus and vagina are $5\frac{7}{8}$ inches in length. The uterus, $2\frac{1}{2}$ inches long and $1\frac{1}{16}$ inch wide at its widest part, consists of fundus, body, neck, and os. The neck has unusually well-marked arbor vitæ. Just with-

in the os the mucous membrane appears abraded. The body has a triangular cavity, into which the Fallopian tubes enter by large orifices. The *vagina*, $3\frac{3}{8}$ inches long and $1\frac{1}{4}$ inch wide, is rugous, especially near its termination anteriorly, and has distinct columns. Anteriorly it contracts to terminate in the canal common to it and the urethra, and at this point has a sufficiently well-marked hymen.

The Fallopian tube of the right side permits air to be blown through its whole length. Near its termination in a fimbriated extremity, it becomes a little convoluted and dilated. Its length is $3\frac{7}{8}$ inches. At a distance of $2\frac{1}{8}$ inches from the uterus, and in its usual position, is an *ovary* with a lobulated surface.

The broad ligament on each side exists as in an ordinary female uterus. On the left side the round ligament is to be seen diverging from the broad and pursuing, so far as traceable, the usual course which it would pursue under ordinary anatomical conditions. On the right side the Fallopian tube admits the passage of air only for a certain distance. Near the uterus it is of large size, but it soon diminishes and becomes smaller. It is traceable to the point at which the "cord" of the tumour was divided, and is accompanied by the round ligament in its whole distance, no appearance indicating the usual divergence of it from the Fallopian tube on the anterior surface of the broad ligament. No ovary is found on this side.

The *rectum* lies behind the uterus, and is in all respects normal.

Dr. Ellis, Microscopist to the hospital, gives us the following results of his investigation.

Examined with the microscope the breasts were found to be composed of fibrous tissue, and a few small nuclei. No lobules were seen.

The mass removed before death consisted of two parts, the largest of which was rounded and solid; the other was composed of cysts. The former was $4\frac{1}{2}$ inches long, $3\frac{1}{2}$ wide, and $2\frac{1}{2}$ thick; the latter two or three inches in diameter. On close examination, nothing like a vas deferens could be found, but at one part were a number of parallel bloodvessels.

Remarks.—The internal organs in the case we have been considering seem evidently to belong to the female sex with the exception of the prostate gland. The importance of this as connected with the male sexual organs has diminished in the eyes of distinguished philosophical anatomists who have lately written on the subject, being considered as much an appendage to the urinary organs as to the sexual. We, therefore, with some difficulty account for the impetus given to the external male organization, beard, larynx, penis, and general masculine formation of the body; and the views we have entertained in regard to the effect of the sexual organs on the external character, seem to be very much disturbed by the present case. It might be very interesting to trace the analogies between different organs in the male and female systems, which are suggested in this instance, but we will refer to the very thorough and interesting paper of the distinguished Professor Simpson, of Edinburgh, on hermaphrodism, in the second volume of his obstetric works, edited by Dr. Priestly, of Edinburgh, and our talented townsman, Dr. Horatio R. Storer, where this whole subject has been most fully elaborated, and we may almost say exhausted.

The drawings which illustrate this case were originally made of the natural size of the parts, by Dr. L. Manlius Sargent, so distinguished for the accuracy of his delineations of anatomical specimens, and could they be exactly copied would answer fully as well as an actual inspection of the parts.

It may not be considered inappropriate to append to this case the following, reported by me to the Boston Society for Medical Improvement, in May, 1857, and extracted from their records :—

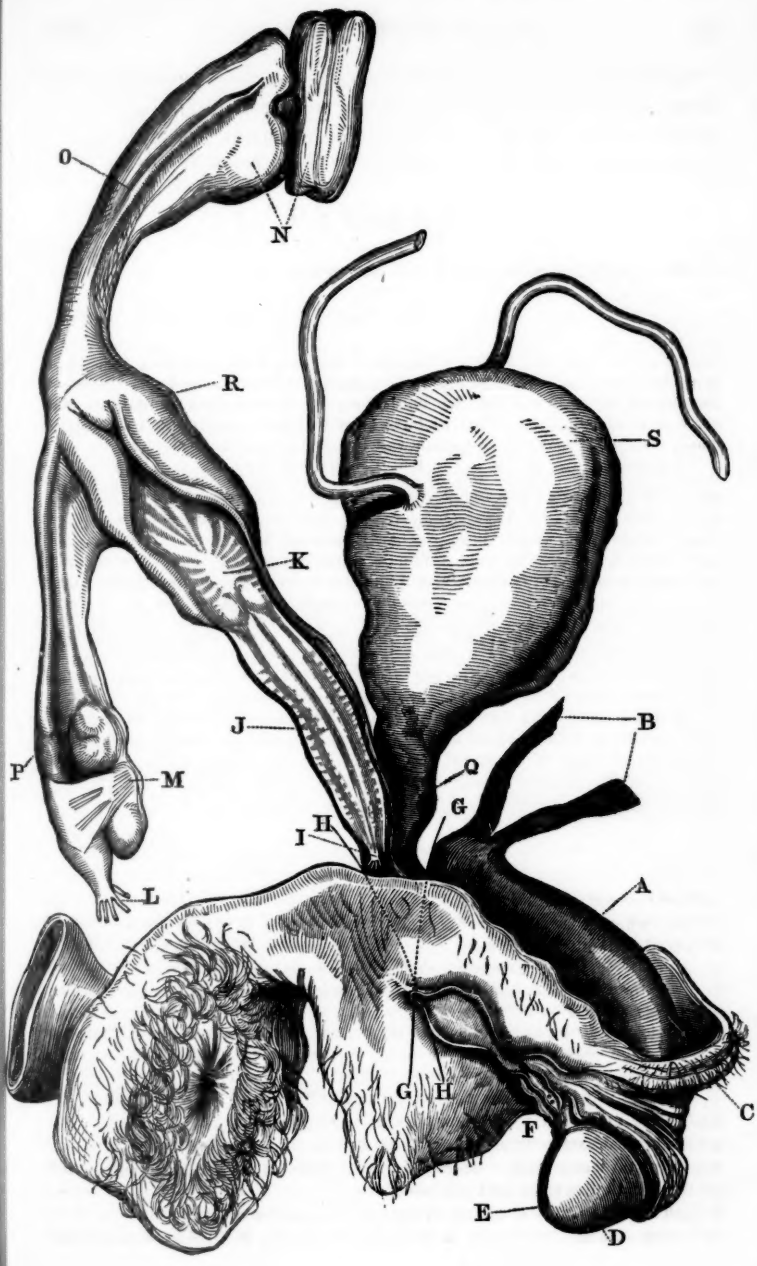
"The subject of this very uncommon deviation from nature, was 25 years of age, born in Maine, of healthy parents. He was by occupation a sailor; and the appearances to be described were only discovered when brought to the prison, where, on being undressed to put on the prison clothes, he was thought, from the large size of the breasts, to be a female in disguise, and was, therefore, transferred to the surgeon of the institution, Dr. Morris, for examination. On my visit to his cell, he seemed to have no objection to having an examination made, when it was explained to him that it was for a scientific object.

"Beginning with the face, the features are soft, and the expression mild; there is no beard. The neck is of medium size and length, but rising toward the back, as in the female. The shoulders are sloping, round and smooth, the muscles not being prominent. The upper extremities are delicate, and the hands small. The breasts, which are the most striking feature in this person, are large, well developed even for a female, quite handsomely formed, with large blue veins running over them, as in a nursing woman; the nipples being large, with a large, dark areola. The abdomen is quite prominent; the navel deep; the hips very broad, as in the female. There is a small penis. The scrotum and testicles are very small, the size of the latter being that of a bean. The legs are short, the middle of the body being, by measurement, half way between the umbilicus and the pelvis, instead of being, as in the male, at the pubic region. The voice is masculine; the sexual propensities normal.

"The interesting and remarkable feature of this case is the fact of the small male organs of generation implanted on a body almost entirely female. Cases constantly present themselves to the observation of medical men of malformed genital organs, having the appearance of a combination of the male and female; also of men with a large mammary organ. In this case there can be said to be no malformation."

EXPLANATION OF PLATE.

A. Right corpus cavernosum penis. B. Crura penis.
C. Skin where it turns up over pubes. D. Glans penis.
E. Distal extremity, or commencement of hypospadias. F. Triple row of nymphæ.
G. A bristle inclining forwards, passing through the aperture at the proximate extremity of the hypospadias, and then coming out in the urethra directly in front of prostate gland.
H. A bristle passing in at the same orifice, and coming out at the entrance of vagina close to the hymen.
I. Hymen.
J. Vagina slit open posteriorly, showing longitudinal and transverse rugæ.
K. Neck of uterus, showing the arbor vitæ.
L. Fimbriated extremity of left Fallopian tube. M. Left ovary.
N. Diseased mass on right side, corresponding with left ovary and Fallopian tube.
O. Right Fallopian tube, partly impervious.
P. Left Fallopian tube, at the beginning of its trumpet-shaped extremity.
Q. Prostate gland. R. Uterus. S. Bladder with ureters.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REVIEWS.

ART. XIII.—*Outlines of Physiology.* By JOHN HUGHES BENNETT, M.D., F. R. S. E. Professor of the Institutes of Medicine, &c., in the University of Edinburgh. Edinburgh, 1858.

THIS book, as its name implies, is simply a treatise on the "Outlines" of physiology. But even the outlines of a science, which by continuous expansion has reached the extent to which physiology has at present attained, cannot be regarded as a subject easily exhausted. Dr. Bennett has, however, treated it very successfully, in a duodecimo volume, of 247 pages; giving in this space a short but well written and suggestive introduction on the doctrine of life and the generalities of physiology; a division on histological physiology, or the physical properties and functions of the anatomical elements and tissues; one on normal or healthy physiology; and one on pathological physiology. This can, of course, be done only by adopting an exceedingly careful and condensed manner of writing, by confining the author's statements almost exclusively to the results of scientific investigation, leaving out of the question the means by which they have been attained, and by touching upon the prominent points of the subject, without noticing in detail its minute divisions, or following the inequalities of its surface. Dr. Bennett employs, accordingly, a purely didactic style, eminently suitable for his purpose, but, of course, adapted to none other. Some striking examples of this literary and scientific compression may be found under the heads of *Mastication* and *Insalivation* (pp. 57 and 58), and under that of *Excretion from the Skin* (p. 95), though it may be recognized distinctly enough on almost every page of the book.

Notwithstanding the narrowness, however, of his self-imposed limits, as to space, the author is even more comprehensive than usual in regard to his subject; for the physiology of which he gives the outlines is not physiology "pure and simple," but includes, as we have mentioned above, not only the study of minute anatomy, and the properties of the tissues, but general pathology as well, or, as he calls it, Pathological Physiology.

"Histology, physiology, and pathology," he says, "are closely allied, and are only different divisions of the same subject; the facts of one are available for the study of all; and any theory deduced from this branch cannot be correct unless in accordance with the data furnished by the others. We shall, therefore, employ the term physiology in the enlarged sense of comprehending the doctrine of life, whether in health or disease."

This union of physiology and pathology, which is unobjectionable and even advantageous, when the nature of both are fairly understood, has, we think, been sometimes productive of mischief. The expression of our author that "the facts of one are available for the study of all," must be taken in a very limited sense. If we endeavour to arrive at pathological facts by induction from physiological ones, or *vice versâ*, as has been too

often attempted, we shall certainly go wrong, and mystify ourselves with a logical "inconsequence." For the very essence of a pathological condition is that the functions are different from those in health, and that their results are different also. Simple as the statement of this truth appears to be, it has certainly been forgotten, more than once, by writers on both subjects. Because the epidermis is exfoliated, as one of the sequelæ of certain fevers, it has been assumed that it suffers a similar continuous exfoliation during health; and because the blood-globules are diminished in scurvy and chlorosis, it has been supposed that they also undergo a constant destruction in the physiological state. Nothing, of course, can be more unfounded than such an inference, since the very points in which the two conditions differ are relied upon to establish a resemblance between them. It should always be borne in mind, therefore, that while the *nature* of the physiological and pathological phenomena is the same (endosmosis, exosmosis, sensibility, reaction, &c.), the *phenomena themselves* are different; and the demonstration of specific facts, accordingly, in the two departments, must rest on separate and distinct grounds. We believe that, in nine cases out of ten, where a morbid condition is spoken of as the "exaggeration" of a natural one, the expression is, strictly speaking, incorrect. The vascular excitement and irritability of fever have no resemblance, either in degree or in kind, to the natural flush of healthy exercise; and inflammation of a glandular organ has certainly no relationship with the state of physiological congestion, which it presents during the performance of its normal function.

While the physiologist and pathologist, however, should carefully separate the study and demonstration of particular facts in the two departments, there is no reason (except in the enormous extent to which each has been developed) why these departments should not be cultivated simultaneously, and in connection with each other. We fully agree with Dr. Bennett that the doctrine of life, in its widest sense (*biology*, as it is now called), properly includes the morbid as well as the normal functions and phenomena of the living body. Viewed, indeed, in a purely scientific light, disease is a perfectly natural phenomenon, as well as health. The philosophical doctrines of Mr. Geo. Combe, will not bear the practical examination of the physician and the naturalist. Disease, in any particular case, appears to be an accidental occurrence; pneumonia produced by imprudent exposure and wet feet, or cirrhosis, as a consequence of late hours and hard drinking. But it needs only a moderately extensive acquaintance with nature and her operations, to see that disease in general is not dependent on fortuitous causes, but is an essential and natural element in the life of man. The body is so framed as not only to perform certain healthy functions, but so as to be liable, in addition, to certain morbid derangements; and these derangements, or the liability to them, are just as much a part of the natural organization of the body, as its power of performing the healthy functions. When disease occurs, therefore, it is to be attributed quite as much to the natural constitution of the body, as to the particular exciting cause which called it into activity; for it is produced by the necessary reaction of the organism against a morbid stimulus, as the healthy functions are the consequence of its reaction against a natural one. The same thing is still more evident when we recollect the long list of hereditary diseases, and of those which, depending on congenital predispositions, come into activity, with more or less certainty, at particular periods of life. Contagious and miasmatic fevers, contracted unconsciously in the rounds of ordinary social intercourse, or in visiting unknown localities, result inevitably

from the operation of perfectly natural causes. The lower animals, often erroneously asserted to be exempt from human faults and infirmities in this respect, are in reality subject to diseases, as every one knows who has charge of them, less numerous and varied, no doubt, than those of the human subject, but perfectly well defined, frequently peculiar to certain species or families, and sometimes identical with those which affect man. Excrescences, blights, and malformations, existing even in vegetables, show that diseased or abnormal action is not confined to the animal creation, but plays its part, as an occasional phenomenon, throughout the entire range of organized beings. The science of life, if complete, must therefore include it, as well as physiology proper.

In the first division of his subject, the author passes in review the ultimate anatomical constitution of the animal fluids and tissues, giving, in a few words, but in a clear manner, the general characters of molecules, granules, cells of various kinds, fibres and tubes. He gives in full, the "cell theory of organization," as first developed by Schwann and Schleiden; a set of ideas which answered a good purpose in its time, by connecting the most prominent and interesting facts, relating to the subject, in a regular order, but which hardly represents with fidelity the present condition of minute anatomy, as it is understood by most microscopic observers. The "cell theory" should be employed, we believe, as a convenient, though somewhat arbitrary *classification* of minute anatomical forms, rather than as descriptive of actual transformations undergone by them in the process of growth. We cannot be sure, because cells of two different forms are found in contiguity with each other, or cells and fibres mingled, that a transformation or transition takes place from one form to the other. They are more frequently found, on continued observation, to be independent of each other, so far as regards the manner of their production, and associated only by the natural constitution of the tissue of which they form a part.

The author gives, in connection with the description of the tissues, a concise account of the physiological properties belonging to them, as tissues, and to the elementary forms of which they are composed. To molecules is attributed the first part, in order of time, in the formation of the tissues, these minute bodies coalescing, under the influence of development and nutrition, into nuclei, cell-substance, membranes, &c. The special function of the blood-globules is declared to be "the further elaboration and preparation of the *liquor sanguinis.*" The glandular and secreting cells are credited with their inherent power of selecting the materials which are to transude through them from the blood, or to originate in their substance; and the irritability of the muscular fibres, as well as that of the nerve tubes, receives appropriate mention. This portion of the book terminates with a *resumé* of physiological chemistry, of the general properties of living beings, their physical and vital phenomena, and a short exposition of the nature and relations of the physical and vital forces.

The definition of *life* alone has always given endless trouble to those who have attempted it. Witness the numerous clumsy phrases, invented by various writers, most of which are utterly unsatisfactory, while no one of them does its work as completely as we could wish. "The sum total of the functions which resist death;" "The constant uniformity of phenomena with diversity of external influences;" "The special activity of organized bodies;" "Organization in action," &c. &c. The point in which most of these definitions fail of giving satisfaction, is that they nearly all

speak of life, in some way or other, as consisting only in the phenomena presented by organized bodies, and not as the hidden force from which they spring. Many of them take pains, indeed, to deny the existence of any such internal force, and regard the visible actions of a living body, its various functions and processes, as being, simply and literally, nothing more than an aggregation of different phenomena dependent on the constitution and properties of the different tissues and organs. An animal, in their view, is an organized structure, in which the muscles contract, the lungs breathe, the nerves feel, and the glands secrete; and nothing more. For them, there is no individuality in the compound life of an animated being. It is merely an agglomeration of parts and functions, the continued performance of which depends upon the peculiar manner in which they are linked together in the physiological condition. Death, accordingly, results from the accidental derangement of one of these functions, the others becoming arrested afterward, in consequence of their mutual connection. Thus, if the trachea be tied, the blood becomes vitiated from deficiency of oxygen, the senses are clouded and the consciousness destroyed, and, the impure blood stagnating in the capillaries, it no longer returns to the heart which, of course, ceases to beat when it loses the necessary stimulus of a constantly returning current. If the animal be destroyed by breaking up the medulla oblongata, it is only that the stimulus to respiration is taken away, and the other consequences follow, in order, as before. Those who adopt the above definitions would therefore regard the termination of life exactly as the stoppage of a complicated machine, in which the breaking of a strap, or the insertion of a foreign body between two cogwheels, should arrest, in consequence, the motion of pistons and levers, the working of air-blasts and water-pumps, the revolution of magnets and the excitement of electric currents.

There is, on the other hand, a strong tendency with some minds to believe in the existence of some central force, or intangible property, in the living organism, which presides over this association of functions, and which is lost at the time of death. It is difficult to look at the body of an animal, suddenly killed, and not to imagine that it has lost something which it possessed a moment before. The stoppage of the animal machine, it is true, depends on some mechanical or chemical derangement of its parts, and its want of power to begin again is owing to the peculiar mingling and intertanglement of their mutual dependencies. So that, though the disturbing cause may be temporary in its duration, its effects are permanent. If you once put out the fire (which by its own heat maintains its own combustion) the instant afterward it is incapable of relighting itself, though the carbon be still there, and the oxygen as abundant as ever. But they will no longer unite, because the *heat* is wanting, which is necessary to effect their combination. Even here, therefore, something has actually been lost, in the stoppage of combustion; an intangible and undefinable force, it is true, but still one which is essential to the production of the physical phenomena, and which, when once allowed to escape, cannot be recalled. Such is the power, or force, supposed by some to reside in the living body, and called by the name of Life. It is clear that, understood in this sense, the word means much more than the assemblage of certain peculiar phenomena. The phenomena are only the signs of its manifestation, and it may continue while they are in abeyance, as in cases of syncope, and the dormant condition of seeds and ova.

We believe that there is some foundation for the view last mentioned,

and that our instinctive perception of an internal principle of vitality is not a mere artifice of ignorance and self-deception; but that we express by it a similar idea to that of the physicist when he speaks of the force of gravitation as belonging to matter, or the force of magnetism as residing in an iron bar. As Dr. Bennett justly remarks, we are as ignorant of the true nature of physical as we are of vital forces, and it is only from their effects that we can know either of them. The term life, therefore, if it be taken in this sense, is one of those words which are incapable of definition, because its manifestations are so varied, while its nature is unknown.

Dr. Bennett begins the subject of normal physiology with the function of nutrition. This function he defines, as we think, with great propriety, as including the introduction into the stomach of alimentary material and its digestion, the formation of the blood, the changes of respiration, the exudation of nutritive fluids into the tissues and formation of secretions, the retrograde metamorphosis of the tissues and their reabsorption into the blood, and, finally, the discharge of the excrementitious substances from the frame.

"We believe," he says, "that it is only by understanding nutrition in this enlarged sense, that we can obtain a correct explanation of the dependence of one process upon another, as well as of those important affections which may appropriately be called diseases of nutrition."

All the processes enumerated above are in fact so closely connected with each other, that one appears to follow necessarily in the train of its predecessor; and in the natural course of study, they are certainly to be grouped in company with each other. The author describes the important properties of the various alimentary substances, and the part which each is supposed to play in the function of nutrition. The destination attributed to the nitrogenous and non-nitrogenous elements of food, is that first brought prominently forward by Liebig, and afterwards employed to distinguish them as the *plastic*, or nutritive, and the *heat-producing* alimentary substances. The ideas of Liebig in regard to this subject are, in fact, freely adopted, and his phraseology employed to a great extent in this portion of the work; the living body being regarded as an apparatus of combustion, and many, if not all, of its exhalations and excretions as the results of this process.

There is some advantage in adopting this mode of describing the nutritive changes, when so much is to be told in so small a space as Dr. Bennett's book allows. It brings prominently forward before the mind of the reader that great fact of the incessant and indispensable absorption of oxygen by the living body, which is at the same time one of the most striking and most universal of the physiological phenomena. It fixes it upon the recollection of the student, that, as a fire cannot burn without air, so an animal cannot live without breathing; and respiration and combustion, associated with each other by the identity of their conditions, fix these conditions in the memory of the student, and facilitate their description.

But the theory and its expression have disadvantages also, which more than counterbalance any benefit to be derived from them, unless for a very popular or a very superficial treatise. The more condensed the author's style, the more precise and unvarying must be the terms in which he describes this oxidizing or "combustive" process, to which the living body is subjected; and the more certainly will the reader imbibe the erroneous idea, that the relation between respiration and combustion is not simply a

resemblance in their principal *conditions*, but a resemblance, or identity, of the *processes themselves*. It is even sometimes difficult to be sure, when a writer employs this phraseology, whether he intends it to be understood in the former sense or in the latter; and in other instances it is certain that the theory is adopted as a complete explanation of the nature of the entire respiratory process. It is curious to observe how, after its adoption, all the phenomena of nutrition are ingeniously fitted into its edges—those which will not adapt themselves to it on any terms being quietly left out of the question, as of no interest whatever. The production of urea, for example, is regarded as the most complete state of oxidation, or combustion, for those principles of the body which are not convertible into carbonic acid; and uric acid as the stage of oxidation next below. The presence of uric acid in the excretions is accordingly owing to the imperfection of the combustive process, and a more active respiration would convert it into urea.

"In this manner is explained how the urine of the boa constrictor is semi-solid, consisting almost entirely of bi-urate of ammonia, as the animal eats an enormous meal of nitrogenous food, but being a cold-blooded, slowly respiring animal, it takes in too little oxygen to convert the uric acid into urea. On the other hand, the lion and the tiger, equally carnivorous with the serpent, are rapidly-respiring, warm-blooded animals, and although, from their violent muscular exertions, rapid and great destruction must occur, scarcely a trace of uric acid is found in their urine, as it is all converted into urea at the moment of its formation, in consequence of the abundant supply of oxygen."

The presence of uric acid in the urine of the cold-blooded reptiles is thus attributed to their deficient respiration, and regarded as a corroboration of the above theory; while no weight is given to the equally important fact that uric acid is also a characteristic product of the warm-blooded and rapidly moving birds, in whom respiration is even more active than in mammalia. The greatest disadvantage, therefore, of theories like the above, is that they may lead us to place a false interpretation on the facts which we unconsciously endeavour to bring into harmony with them.

In the division on the nervous system, the general properties of the nervous tissues are given, as well as the particular functions of the various ganglia and nerves—all being treated with the same condensed and well-managed brevity which characterizes the other portions of the book. The phenomena of sleep, dreams, somnambulism, and what the author calls, *mono-ideism*, or the condition of those who are under the influence of mesmerism, religious ecstasies, &c., are described in such a manner as to be both interesting and useful to the practical physician. In the division on reproduction, a very capital series of twenty-eight cuts is introduced, valuable as showing the successive stages of development in the ovum of the same species of animal (dog). Part Third is occupied with the description of the phenomena of congestion, inflammation, exudation, fever, ulceration, morbid growths and degenerations, derangements of the nervous system, and a short chapter on the various modes of death.

In a book which goes over so much ground in so small a space, the reader cannot, of course, expect any part of the subject to be treated in an exhaustive manner, but Dr. Bennett's work certainly fulfils its own object in a remarkably successful degree. We notice, however, several inaccuracies, both of statement and expression, not necessarily connected with the style or arrangement of the book, some of which at least are undoubtedly the result of oversight.

The diameter of the molecular fibres of coagulated fibrin, for example, is given (p. 27) as $\frac{1}{12000}$ to $\frac{1}{16000}$ of an inch. This measurement is at least ten times too large. A similar error exists, on page 28, as to the size of the white fibres of areolar tissue, which are said to vary in thickness from the $\frac{1}{12000}$ to $\frac{1}{30000}$ of an inch. They are seldom, if ever, larger than $\frac{1}{200000}$. This inaccuracy is the more striking, as the size of the yellow elastic fibres is correctly given a short distance below on the same page, viz., $\frac{1}{40000}$ to $\frac{1}{120000}$ of an inch.

The daily quantity of urea excreted by man is estimated (p. 93) as only 270 grains. The actual observations made by medical men, of various stature, on their own persons, give the quantity of urea in twenty-four hours as 487, 670 and 408 grains (Lehmann, Hammond, John C. Draper).

The animal organism is said (p. 36) to return to the atmosphere—"carbonaceous matters in the shape of carbonic acid, hydrogen as a constituent of water, and *free* azote in the form of *oxide of ammonium*."

On page 39, in the enumeration of the proximate principles, we are told that "*fibrin* forms nearly the whole substance of the muscles."

The pigmentary principles are said (p. 40) to be "evidently allied to the oily constituents in living beings;" and again (p. 51), the pigmentary substances may be "regarded as a modification of the fatty." We do not know upon what grounds such a comparison can be based. The pigmentary principles all contain nitrogen as an ultimate element, and are, therefore, totally distinct, in chemical constitution, from the fats. They are accordingly usually associated, by writers on this subject, with the albuminoid principles.

"The temperature of arterial blood (p. 76) is one or two degrees higher than venous blood." The blood in the veins of the surface, or that coming from the extremities or thin membranous parts, as the ears of rabbits, horses, &c., is found to be a little cooler than arterial blood, owing to its exposure to the external temperature, while passing through the capillaries; but venous blood, simply as such, is not of a lower temperature than arterial blood. Indeed, the venous blood coming from the internal organs, which has not been subjected to cooling by external exposure, is almost invariably found to be warmer than arterial; and the arterial blood of the left cavities of the heart is constantly of a sensibly lower temperature than the venous blood of the right cavities. These points have all been elucidated by the careful experiments of Bernard.

In speaking of the formation of the corpus luteum, after the occurrence of hemorrhage into the ruptured Graafian vesicle, and coagulation of the effused blood, the author says (p. 159): "This coagulum of blood becomes gradually absorbed, in the course of which it changes its colour, and assumes a yellow and puckered appearance. In this state it has been called *corpus luteum*," &c. It is not the coagulum of blood in the ruptured Graafian vesicle that assumes the yellow hue characteristic of the corpus luteum, but the thickened and hypertrophied wall of the vesicle itself, in which the coagulum is enveloped.

The author sometimes employs expressions, while speaking of the urine and its ingredients, which might seem to imply that they constitute a true secretion, formed by glandular cells, in the same manner with other secretions. Thus he says (p. 21): "Why some of these (glandular) cells should secrete bile, *others urea*, a third class saliva, a fourth milk, and so on, is only explicable by attributing to these minute corpuscles the possession of vital properties, whereby one attracts and selects from the neighbouring

bloodvessels the materials which it forms into bile, *a second such as it fashions into urea*, and so on." And again (p. 91), the arrangement of the Malpighian tufts and bloodvessels in the kidney "permits the ready passage of a large amount of water from the blood, which, as it flows out through the ducts, receives the secretion *formed by the cells which line them.*"

It would be better, in a book devoted to physiology, always to give a distinct and unmistakable expression to the fact, universally acknowledged, that the urea and other characteristic ingredients of the urine are not formed in the kidney, either by cells or any other elements of its structure, but are drained away, ready formed, from the blood which passes through the capillaries of the organ. This fact is so essential, and separates the function of the kidneys so completely from secretion proper, that it is worth keeping in the foreground whenever these organs, or their function, are the subjects of discussion.

Perhaps the most satisfactory chapter in Dr. Bennett's book is that on the "General Pathology of the Nervous System," in which the most important characteristics of this department of pathology are laid down in the form of certain "pathological laws," as, for example,

"*All the functions of the nervous system may be increased, perverted, or destroyed, according to the degree of stimulus, or disease, operating on its various parts.*

"*The seat of the disease in the nervous system influences the nature of the phenomena or symptoms produced.*

"*The rapidity or slowness with which the lesion occurs, influences the phenomena or symptoms produced.*

"*The various lesions and injuries of the nervous system produce phenomena similar in kind.*"

The application of each of these laws is elucidated, and its operation exemplified, in a rapid but exceedingly judicious and profitable manner. The whole division on pathology is also well arranged, and is at least an equally important element, in the plan of the book, with the physiological part. The mechanical execution of the whole is admirable, and leaves nothing to be desired in clearness, elegance, or convenience of arrangement.

J. C. D.

ART. XIV.—*Third Report of the Clinical Hospital, Manchester, containing Results in Physical Development, Hooping-Cough, and Transmitted Diseases.* By JAMES WHITEHEAD, M. D. London, 1859.

UNDER this unpretending and rather indefinite title, Dr. Whitehead has presented us with a series of statistics in reference to the physical development of children, and to certain questions connected with the etiology, history, and therapeutics of some of their more prominent diseases, which, as far as they go, are of deep interest to every practitioner in his study of the hygiene of the first stages of existence, and of the diseases which are then most liable to occur, with their proper management. These statistics are based upon facts derived from the observation of 2,584 patients, comprising those of all ages, from earliest infancy to the termination of the period of childhood, treated at the Clinical Hospital of Manchester, from January,

1856, to the end of October, 1858. They are presented with a degree of candour, and an absence of all appearance of an intention to sustain by them any foregone conclusion of the author, which gives to them a character of perfect truthfulness.

The 2,584 patients above referred to include 288 readmissions, children who had been previously under treatment, and cured or relieved, but brought again under notice, after longer or shorter intervals, either in consequence of relapse, or for some other form of disease, and claiming special attention in consequence of their recorded physiological history.

Of the whole number, 301 were under six months of age, 341 were between six and twelve months, making a total of 642 under one year; 593 were between one and two years old, making a total of 1,235 under two years of age; 373 were between two and three years of age, making a total of 1,608 under three years; 571 were between three and six years of age, and 405 between six and fourteen years.

The majority of the patients were males, these bearing a proportion to the females of 8 to 7. About one-fifth were children of Irish parents, and a few (25 in all) of foreign parents. 13 were premature births—20 twin births—and 32 were illegitimate.

About ten per cent. of the entire number were destitute and forsaken children—namely, 9 orphans, 20 deprived by death, and 2 by desertion, of their mothers, and 88 by death, and 35 by absence, of their fathers. 87 were in a state of extreme uncleanliness and neglect; of the neglected, 12 were illegitimate, and 9 orphans or whose fathers were absent.

Nearly two-thirds of the patients had been placed from their birth under the most unfavourable hygienic circumstances—such as residence in unhealthy localities; in closely built streets and alleys; in overcrowded dwellings or underground apartments, with deficient ventilation; neglect of domestic and personal cleanliness, and unnutritive and badly cooked food.

"Superstitions and prejudices, prevalent among some of the lowest orders, operate," we are told, "in a remarkable manner to the detriment of infant life and health. When a child is seized with fever or other malady of severe character, it is generally deemed by the parents to have received its death stroke, and its extinction is waited for with easy resignation, without a thought of seeking remedial aid beyond their own resources."

"From the moment the idea seizes one of these mothers that her child's malady is to be fatal, all attention to cleanliness, and the comforts derivable therefrom, is discontinued, under the belief, as alleged, that exposure of the skin would be the means of hastening the fatal issue."

Dr. Whitehead describes a maculated condition of the skin as being frequently met with in the children of this class of people, consisting "of small circular spots the size of face freckles." They occupy chiefly the trunk of the body, or those parts covered by the clothing. They have a purple colour, like the maculæ of typhus, and are unassociated with any distinct form of disease, but would seem, nevertheless, to indicate a depraved habit of body. "The skin has a sickly, opaque pallor, the flesh is flabby, the temper fretful, and the energy subdued." These maculatæ would seem to be caused by sloth and personal neglect; they are, we are assured, never met with in the offspring of the cleanly and thrifty.

Dr. Whitehead thinks that this *macula cachectica* is in reality a disease of the skin, due proximately to interrupted cutaneous transpiration caused by the extreme personal uncleanliness which prevails among the children of "the lowest classes."

In order to ascertain whether a certain proportion of the diseases of infant life do not arise from a faulty condition of the development process, the result of causes that may be removed, and consequently to show, if this be the case, that such diseases are susceptible of prevention, inasmuch as the faulty condition which causes them may be more readily and naturally rectified by hygienic than by medicinal means, the patients treated at the Hospital were subjected to a careful series of observation to determine, as far as possible, the condition of their physical development.

"The objects aimed at in this particular branch of inquiry are: 1st. The laws of physical development in infancy, as indicated by the age at which the teething process commences, and that at which it is finally accomplished—the growth of the bony structures, as shown by the age at which that of the skull is completed; the age at which the faculty of walking is attained; all in a state of health. 2d. The manner in which one or more of these processes may be delayed by morbid agencies, and which of such agencies is the most commonly operative in its interference with the natural efforts."

The actual states of development are divided into the *good*, the *medium*, and the *bad*.

"The children marked as being of *good* development are those brought under observation for disorders of local or of acute character, of climatic, zymotic, or adventitious origin, not of inherited or constitutional tendencies to disease, in whom the process of development has not previously been interfered with, whose bodily health is, as a general rule, faultless, and whose parents are healthy. Those of *bad* development are they whose health has been deranged by inherited weakness or tendency to disease, by want of a due supply of breast milk, by faulty diet, poverty, unhealthy locality, or neglect. Those of *medium* development are such who, in any of these respects, cannot be classed with either of the preceding.

"Of 2,584 patients the development was—

Good in	1,030
Bad in	615
Medium in	541
Unknown, or the accounts not reliable, in .	398

"The last two items, amounting to 939 individuals, are consequently rejected. The first two, representing the two extremes, being alone serviceable in drawing conclusions."

The results in relation to the process of teething are based upon observations made in 763 children of good, and in 485 of bad physical development, for the *first pair* of teeth; and for the other teeth, in 83 children of good and 72 of bad development, between twelve and thirteen months old; in 316 of good and 137 of bad development, of two years of age.

From five tables given in the report, it appears that, in the great majority of children of *good development*, namely, in 600 out of 763 (79 per cent.), teething had fairly commenced previously to the end of the eighth month, and in only 21 per cent. was it delayed beyond the eighth month, namely, in 81 of whom it occurred between the eighth and ninth months, and in 64 between the ninth and twelfth months. In none was it delayed beyond the fourteenth month.

In children of *bad development*, only 161 out of 435 (37 per cent.) cut their first teeth before the end of the eighth month; and in 63 per cent. teething commenced after the eighth month, namely, in 63 at nine months, in 107 between ten and twelve months, and in 104 after the twelfth month.

Of 83 patients of *good* and 72 of *bad* development, between twelve and thirteen months of age, of the *first* only one had no teeth, but of the

second 24. At the age of two years, of the children of *good development* 88.6 per cent. had all their teeth, while in those of *bad development* in only 21.8 per cent. was teething completed. Of the *former* only one had so few as twelve teeth at two years of age, but of the *latter* there were 25 whose teeth at that age did not exceed twelve.

In 62 children of *good* development, teething was completed previously to the second year, namely, in one at twelve months, in two at fourteen months, and in 47 before the end of the twentieth month. In 14 teething was not accomplished until after the age of two years.

In 53 children of *bad* development, two only completed their teething before two years of age—one at twenty and one at twenty-one months. In 51 teething was not completed until subsequent to the second year.

"From the above statement," observes Dr. Whitehead, "it will appear that in children possessing the advantages of mature intra-uterine growth, untainted parentage, proper nourishment, and healthy locality, the teething process ought to commence at from five to eight months, and that the accomplishment of its different stages at the periods mentioned gives fair promise for the due attainment of the other processes presently to be mentioned.

"From these data it may be inferred that at the age of fourteen months a child should have ten teeth or more, and that six teeth are the minimum number compatible with good development and favourable prospects at that age.

"The complete irruption of the whole twenty teeth was accomplished in children having a favourable state of the development processes, in nearly 90 per cent., at the age of two years; and as in a considerable number of them this process was completed much earlier, statistics will warrant the conclusion that the teething process should, as a rule, be completed in healthy children at the age of two years.

"It seems worthy of notice that *precocious dentition*, that is, the irruption of the first teeth before the fifth month, had not in every case a favourable significance. Among the patients comprised in the above records, 180 were of this category, having commenced teething at two, three and four months. Of these, 38 were of bad development, in many of whom the process was subsequently interrupted—the next teeth after the first two not appearing until many months afterwards, sometimes not until very late. In several instances in which the first two teeth were cut at two months, the next did not appear until after the age of two years. This precocious dentition would appear, therefore, according to the above data, to give little promise for the favourable progress of after development, inasmuch as among the number recorded of this class, a considerable proportion were afterwards altogether badly developed. On the contrary, the precocious irruption of *all* the twenty teeth is the constant attribute of an excellent state of development. Not a few of the children who accomplished the teething process at sixteen or eighteen months or earlier, were able to walk freely at nine months, and were exceedingly strong in all their physical faculties.

"As regards the disorders of teething—the alleged disturbances, namely, which are said to be caused by difficulties of protrusion and over-tension of the enveloping gum, it appeared evident, in many cases, that both the concomitant ailments and the retardation of teething depended more upon the faulty state of the developmental processes generally than upon local irritation, as it was in but few instances, and these only in infants of highly excitable and nervous temperaments, that scarification was followed by relief. These disorders are doubtless due to constitutional rather than to local causes.

"Three children had each two teeth in the lower jaw at birth. In two of these it was found necessary to remove them because of the injury they inflicted on the under surface of the tongue, while sucking; in the third, now two years old, the congenital teeth remain—the whole teething process being completed, and the child well grown and healthy."

The observations made at the Clinical Hospital of Manchester, in re-

spect to the condition and progress of ossification, commencing with that of the skull, show that in 100 mature infants examined twenty-four hours after birth, the sagittal suture was open or membranous from the posterior fontanelle to the lower part of the frontal bone, with an average length of 5.6 inches—varying but very little in different individuals, or in the two sexes. Its shortest measurement was 4.5 inches, but only in one child every way very small, with a head below the average size, measuring only twelve inches in circumference. The coronal suture was 3.08 inches in extent, and nearly the same dimensions in every child. The great central space, diagonally, measured from 1.5 to 2.5 inches.

The process of ossification progresses at the outer extremities of the sutures with great rapidity during the early months of life. At the age of one month, the sagittal was found in children of good development to have become shortened from 5.5 to 4.5 or even 3.5. At the age of two months the sagittal suture was from 3 to 4, the coronal from 2.25 to 2.50. At about from three to six months, the central space was reduced to a diamond shape, measuring between the points 3 by 2, and between the sides from 1 to 1.5 inches.

In 191 children of *good* development, the fontanelle was entirely obliterated at sixteen months in 101, and in 72 of these at periods varying from one to nine months earlier. In the remaining 90, it was not closed at sixteen months, nor for an average period of four months later—giving fourteen and a half months as the average age for the complete closure of the fontanelle in well developed children.

Of 317 children of *bad* development, in only 15 was the fontanelle closed at the end of the sixteenth month—in more than 220 it was found open after the twentieth month, and in some as late as from three to four and a half years.

According to Dr. Whitehead, a child of good development, with closure of the fontanelle at fourteen and a half months, has usually about fourteen teeth, and has been able to walk firmly several weeks or months; while, in one having at this age the fontanelle largely opened, it frequently happens that not more than from two to six teeth have appeared, and the child is unable to walk. Even at the age of two years, when the teething process should be completed, the fontanelle being still open, there are generally not more than eight to twelve teeth.

"The closure of the fontanelle, therefore, gives a fair indication of the state of the developmental processes, being accompanied generally, with the exception of a few cases of irregularity, by a corresponding condition of dentition, of the faculty of walking, and of the whole physical frame."

Dr. Whitehead remarks that there is occasionally met with an abnormal development of the osseous system from "over-intense ossification"—a state of things which he is led, from actual experience, to consider as comparatively more disastrous in its consequences than the opposite condition of retarded growth. While this excess of ossification is in no way detrimental in its effects upon the bones of the trunk and extremities, it is peculiarly injurious by causing a too early closure and consolidation of the sutures and fontanelles of the cranium, and thus interfering with the due development of the brain in its rapid growth throughout infancy and the early period of childhood.

"It was stated," he says, "in the first report that one such case had then occurred; this being the only instance of the kind which either my late colleague

or myself have ever witnessed. Since that statement was made three other cases have been brought under observation, and a fourth with fatal issue, belonging to one of the families concerned, was noted, making in all five cases of *over-intense ossification*. The case already recorded was in a child three and a quarter years old. When brought to the institution he presented unequivocal signs of compression of the brain. 'He looked dull, the head hanging constantly forward on the chest, mouth open with constant salivation. The circumference of the skull was 17 inches, that of the chest 19 inches; a great predominance of the chest for the age; skull, relative to the size of the body, of small dimensions, but very convex. On the top of the skull, in the place of the fontanelle and part of the sagittal suture, the bone was completely solid, and elevated so as to form a rounded ridge to the height of half an inch. The mother stated that he was a strong healthy child to the age of eight months, after which the present disorder developed itself. The child cut his first teeth at six months, and had all the twenty at from fourteen to eighteen months. He walked firmly at nine months. She was a strong woman; said she had always had as much milk as would have sufficed to sustain two children at the same time. She had given the breast alone to each of her children to the fifteenth or eighteenth month. This child died of convulsions. The explanation we give of this condition is, that by a precocious solidification of the skull, the growing brain became compressed, but while the sutures and fontanelle were still in a yielding condition, the lateral bones being firm, the ridges were formed by the growing brain, compressed in every other direction, and finding less resistance in the situation of the sutures, protruded itself in these parts, which became rapidly ossified also, thus preventing further expansion for the accommodation of its subsequent increase.'

"Of the three similar cases which have since occurred, one, with fontanelle closed at seven months, died of convulsions; another, fontanelle closed at nine months, survives, but suffering from intense diarrhœa; and a third, now four months old, with fontanelle quite closed, suffers from fits of screaming, ending in convulsions. The mother of this child states that her previous infant had a similar condition of skull at four or five months, and died of convulsions."

The next series of obstructions have reference to the actual and relative development of the head and chest. The dimension of these parts respectively, and the proportion the size of the one bears to that of the other furnish, to use the language of Dr. W., in the report before us, most important indices of the power of the system in early life, and of its prospects for the future. Teething, he remarks, may be late, the faculty of walking retarded, or the ossification of the skull delayed to a certain extent; but if the brain and lungs, whether large or small, be proportionately developed, the prospects for the future may still be good.

"The cerebro-spinal system is a great consuming organ, appropriating in early life an immense amount of material, which is furnished by the digestive organs and lungs. If the supply be equal to the demand, the progress of growth of the one keeps pace with that of the other, the general health is good, and the promise for the future favourable. When, from any cause, loss of balance takes place, the detriment inflicts itself chiefly upon the muscular and secretory systems, for the brain continues to appropriate and grow with undiminished vigor, while the locomotor powers fail from impoverishment. The first of these conditions is commonly associated with all the attributes of good, the latter with those of bad development."

In the examinations of the head and chest recorded by Dr. W., the measurements of the first were made horizontally around the most prominent portions of the parietal eminences, and a little above the eyebrows; of the second, also horizontally, about three-fourths of an inch below the nipple, escaping thus the lower angles of the scapulæ.

In children of good development, Dr. W. describes the skull as of an oval shape, with gently curved outlines; the convexity across the summit being regular, without any unusual salient frontal or lateral eminences. In the majority of the badly developed it presents no striking anomaly, and is often well shaped. In less favourable cases it is flattened at the summit, with projecting parietal and frontal eminences, giving to it a flat, angular appearance. This is seldom, if ever, noticed before the age of seven months, commonly between the first and second years. It is almost always the indication of checked development, great weakness, and frequently of the existence of rickets.

In well developed children the chest is generally full and equably rounded from the angles of the ribs behind, to the cartilages in front; the sternum being flattened or slightly depressed—the abdomen not projecting beyond the level of the lower ribs. In well-grown and healthy children, at the age of six or nine months, or earlier, there is occasionally seen a slight semicircular depression at the lower part of the chest laterally in front, below the mammary glands. This is often owing to tumidity of the abdomen. In badly developed children, the chest is often compressed laterally, the ribs, from the sixth to the tenth, below the mammary glands, being pressed inwardly, forming a shallow cavity. In some cases this depression seems to be caused by tumidity of the abdomen, drawing the lower margin of the chest forward and outward, but more commonly it is, doubtless, due "to actual impairment of the development tone, and insufficient supply of material for the growth of the solid structures." The yielding and consequent flattening sometimes extends over the entire antero-lateral portion of the chest, with a simultaneous projection of the sternum and costal cartilages, constituting "the pigeon-breast" deformity. It is frequently associated with other unequivocal signs of rickets.

Tables are given of the absolute and relative measurements of the skull and chest, at progressive ages, from birth to the twelfth year, in children of good development—*the type of health*, and in those of bad development—*the type of the scrofulous cachexy, tuberculosis, and atrophy*, from defective nutrition and other causes.

These tables show that the dimensions of the head do not differ materially in the healthy and unhealthy. "The disparity is principally noticeable in the size of the chest, the lungs being the organs which suffer the earliest and most commonly under a state of impaired nutrition." At birth, the measurements are the same for both groups, the health and development being, as a general rule, perfect in the full-grown fœtus. This, then, is the starting point, whence it is interesting to notice the relative growth of the two cavities respectively—especially the chest—under the influence of favourable and unfavourable agencies.

"The most rapid growth of the brain takes place during the last four months of intra-uterine life; the fœtal head, at 4½ to 5 months, measuring about 6 inches, and the weight of the brain being about 6 or 8 ounces; while that of the full-grown fœtus measures fourteen inches, the weight of the brain being about 25 ounces.

"The most rapid growth after birth takes place during the first two months; the next during the third two months, and so on to the end of the first year, after which it gradually decreases in rapidity of growth.

"It has been shown, that at birth the average girth of the head exceeds that of the chest by eight-tenths of an inch. From this time the march of growth is nearly in parallel order—the chest augmenting a little more rapidly than the

head, except in earliest infancy—to about the age of 3½ years, at which period, in those of good development, the measurements are equal."

"In the badly developed, the equality of dimensions of skull and chest which, as above represented, takes place in the healthy at about 3½ years, it is not attained, as is proved by statistical evidence of a similar kind, until two years later—namely, at the age of about 5½ years.

"As a rule, the developmental processes progress much more regularly and evenly during the first two or three months than they do afterwards; the child, at a later period, being exposed to the damaging influences of improper diet, atmospheric impurities, neglect, uncleanliness, infectious diseases, and a multitude of injurious agencies. In one child the measurement of the head at birth was 15.25; increase in the first month one inch and an eighth. At the age of two months the circumference of the head was 16 inches. In another, at birth, the circumference of the skull was 14.25; at the age of thirty days it was 15.15. In one measuring 13.5 at birth, the chest also 13.5, the measurements at the age of thirty days were 14.5 and 14.35 respectively. And so it was in every case examined, amounting to about thirty, the increase during the first month, the children being healthy, and having a suitable supply of breast-milk, being seldom less than one inch.

"The expansion of the chest during the same period was somewhat less rapid, as in the first named of these cases, the trunk, which measured at birth 12.5 inches, at the age of thirty days measured only 13.25; thus, while the brain had increased more than one inch, the chest had grown only three-quarters of an inch; the child being quite healthy, and having a sufficient supply of breast-milk. In one case in which the brain and chest had each a girth of 13 inches at birth, at the age of thirty days the skull measured 14, and the chest 13½ inches. The growth of the chest advances more rapidly after the sixth month, and in the well developed nearly at a parallel rate with that of the brain, until towards the end of the teething period, but not equalling that of the skull until the fourth year. After the fifth year the chest begins to exceed in its dimensions those of the head, and this predominance goes on rapidly increasing up to the twelfth year, at which period its measurements exceed by more than three inches those of the head, and so it continues in advance, in healthy individuals, to adult life. In one remarkable instance, a female, 12½ years old, well developed, the girth of the chest was six inches more than that of the head. But taking children of all castes and conditions, including irregularities, it was only after the seventh year that the predominance of the chest over the head was constant, and from this age it yearly increased, not excepting badly developed individuals."

In comparing the differential measurements of the skull and chest at progressive ages in the male and female respectively, including all conditions of development, it was found that, as a rule, the female chest exceeds, at birth, in circumference that of the male; but without any greater capacity of lungs. The increased circumference being due to the bulk of the mammary glands, which are comparatively larger at birth than for some years afterwards.

The inquiries into the period at which the power of walking becomes established, shows a remarkable difference in this respect between the well and badly developed. Thus of 710 children of good development, 672, or 94.5 per cent., were able to walk freely before the end of the fifteenth month, and only 5.5 per cent. were unable to walk at that age; while of 464 children of bad development, only 70, or 15 per cent., could walk at the age of fifteen months, and 85 per cent. not until after fifteen months. Of the 710 children of good development, only 12, less than 2 per cent., commenced to walk at eighteen months or later; while of 464 badly developed, 216, or 46 per cent., only began to walk at eighteen months or subsequently.

Of the 710 of good development, 52 walked before the end of the ninth month; 77 at ten months; 133 at eleven months, and 188 at twelve months, making altogether 450 (63 per cent.) who walked at or before the end of one year; while of the badly developed, none walked at nine months, 2 at ten, 4 at eleven, and 18 at twelve months, making only 24 (5 per cent.) who walked by the end of twelve months.

"The ability to walk at the age of twelve or thirteen months is, therefore, a certain indication of good development, and favourable prospects for the future."

Dr. Whitehead gives the following as the signs of good development:—

"At the age of *one month*, in children favourably developed, the margins of the sagittal suture at each extremity are already in apposition, and its length shortened one inch or more; the abdomen, although exceeding the chest in girth, should not be tumid; the child should be fully satisfied with a breast meal every 2 or 2½ hours; the food should not be returned in any quantity, and the aggregate hours of sleep should be at least twenty out of the twenty-four.

"At *two months*, the sagittal suture should be reduced from 5½ to 3½ or 3 inches; the girth of the head should be 2, and that of the chest 1¾ inches more than they were at birth; the breast-milk alone should entirely satisfy the appetence; the body and limbs should be plump and rounded, and the sleeping hours eighteen to twenty out of the twenty-four.

"At from *five to six months*, the sagittal suture should be reduced to 2 or 2½ inches, and the coronal to 1½ or 2 inches, so that the fontanelle at this period has a diamond shape, with its sides encroaching upon the space, with slightly curved outlines; the abdomen should be less prominent, the girth of the head and chest each 2½ to 3 inches more than at birth; the breast-food should fully satisfy his wants, at intervals of 2½ to 3 hours, and he ought to sleep seventeen to nineteen hours.

"At *eight months* there should be two teeth; the fontanelle should not exceed 1 to 1½ inch in each direction; the flesh should be firm, the movements of the limbs vigorous, with an inclination to feel the ground with the feet; the sleep should be about sixteen hours, and the circumference of the skull should not exceed that of the chest by more than 1½ inch.

"At *fourteen months* there should be eight or more teeth; the fontanelle closed with bone; the skull not exceeding the chest in its girth more than one inch; the prominence of the abdomen perceptibly reduced; the child should be able to walk, and should sleep placidly fifteen or sixteen hours in the aggregate.

"At *two years* of age all the twenty teeth should have protruded; the skull not exceeding the chest more than ¾ inch; the abdomen not protruding beyond the level of the chest; and the abdominal functions regular, not requiring the use of medicine.

"At *three years* the chest in girth should nearly equal that of the skull; the teeth should be sound, the breath sweet, the limbs straight, the wrists and ankles not bulky, the appetite not voracious, without craving for food or drinks in the ntervals.

"At *four years* the circumference of the chest should exceed that of the head by half an inch; the stature should become more rapidly increased; the limbs, although apparently thinner, should have the muscles firm, and the extremities of the long bones not notably bulky. The abdomen should not be tumid, as is frequently the case at this and earlier ages, from disordered functions and the presence of worms.

"At *eight years* the girth of the chest should exceed that of the skull by 2 to 3, and at *twelve years* by 3 to 5 inches.

"The face should be larger, in appearance at least, than the forehead, especially during the first three years; the shape of the skull not angular or flat, but rounded at the sides, with a proportionably elevated summit, and the chest regularly rounded, without lateral compression.

"Deviations from this general rule not unfrequently occur in children of otherwise good development, but without a bad significance. The most frequent of these irregularities is retardation of the teething process, sometimes to a considerable extent, but in such cases, if the fontanelle be early closed, and the faculty of walking duly advanced, there is no need to fear about the after progress."

An interesting section follows comprising the observations made at the hospital in reference to vaccination. We can afford room only for a notice of the conclusions arrived at from these observations in respect to a common accusation brought against the operation of vaccination by parents; that, namely, it is liable to entail upon children a variety of cutaneous and other diseases. While no satisfactory ground could be ascertained, after patient investigation, in substantiation of this accusation in the majority of cases, Dr. Whitehead considers, nevertheless, that in 34 instances, there was presented sufficient evidence to warrant the belief that a taint had been communicated by the vaccine infection; and in 14 of these the disease implanted was of a genuine syphilitic character. He very properly remarks that this communication of disease is by no means a necessary result of vaccination; it can never occur when care is taken to employ only pure matter in the propagation of the vaccine infection. Physicians cannot, therefore, be too particular in the selection of the virus employed by them in vaccination.

"A child," says Dr. W., "of naturally vigorous constitution, whose blood is tainted with the poison of syphilis, may retain the outward appearance of health up to three, six, or twelve months, or even two or three years, or longer, before a characteristic outbreak shows itself. The parents of such a child may also have the semblance, to superficial observation, of faultless health, although still possessing the seeds of this malady in a degree sufficient for its transmission to their offspring. It is from such sources that mischief is often derived and disseminated by vaccination and other modes of implantation, and it is thus that the efficacy of this great sanitary measure has been in many instances rendered questionable."

Of the 2,584 patients, the history of whose condition and diseases is comprised in the present report, 211, a little more that 8 per cent., had hooping-cough. It is stated that it occurs throughout the year, with greater or less frequency, and in varying intensity, being influenced by the character of the season, and the nature of prevailing epidemics.

Of the 211 cases of hooping-cough above referred to, 59 occurred in the spring quarter; 59 in the summer quarter; 47 in the autumnal quarter; and 46 in the winter quarter.

The severity of the proper symptoms of the disease varied but little throughout the disease; the violence and danger of particular cases depending mainly upon the nature and violence of the superadded affections, and the previous condition of the patients.

In inquiring into the average duration of hooping-cough 35 cases were omitted; the disease in these having existed on admission over two months, the prolongation being evidently dependent on either neglect, severe complication, or some other extraneous circumstance. Of the remaining cases, some of which also fell under the same imputation, having already existed 40 or 50 days, and upwards, the average duration of the disease on admission was 16 days. Thirty of the patients ceased to attend before the cure was complete, and 32 died. The remaining 149 cases were dismissed cured, after an average treatment of 26 days—giving as the duration of hooping-

cough, aided by treatment during the latter two-thirds of its course, a period of 42 days.

Of the 35 irregular cases, 18 had existed more than two months; 7 three months; 6 four months; 1 five months; 2 six months; and 1 three years. The last case may be left out as a singular exception. The average duration, therefore, of the thirty-four cases on admission was 86 days; that occupied in their treatment was 25 days, giving as the average duration of these neglected cases, a period of 111 days.

"The case of three years' standing was in a girl 4½ years old, who had scarcely been a day without two or more paroxysms of severe hooping, since the invasion of the disease at the age of 18 months. On admission, she was labouring under chronic bronchitis, having loud moist rhonchi, and varying regional dulness, with severe cough and dyspnœa. She had frequent fits of coughing and hooping, which ceased only with vomiting of phlegm, often mixed with blood. She was treated with oxy-sulphuret of antimony and opium, and camphor inhalations, and was discharged cured in 26 days."

The usual complications of hooping-cough were, in the winter months, capillary bronchitis, broncho-pneumonia, pleuro-pneumonia; and in the summer months, diarrhœa, dysentery, biliary derangement, and mucous disorders generally. It was also frequently associated, at all seasons, with gastric derangement, retarded or checked development, rachitis, worms, and, in a great majority of instances, it was aggravated by faulty alimentation, the result of ignorance.

In 46 uncomplicated cases, the duration of the disease in 35—excluding 11 neglected cases—from the onset to the termination, was 40 days.

The number of deaths was 32—15 per cent. Only one death occurred among the uncomplicated cases.

"The other thirty-one deaths occurred from pulmonary, gastro-intestinal, inherited, and various forms of disease, most of them previously existing, and several of which would have proved fatal at no distant period. *Seven* of them sunk under broncho-pneumonia, preceded in several by chronic bronchitis; but aggravated into the severer form of pulmonary disease by the spasmodic cough; most of them were associated also with gastric derangement, worms, or atrophy. *Two* died of tuberculosis, both of them the offspring of consumptive mothers, and in two others, not ranged under this head, the existence of tubercles in the lungs was suspected, and almost certain. *Eight* died of convulsions with rachitic, atrophy, bronchitic, or gastric complication; *two* were cases of syphilitic wasting, which would probably have been fatal at a not much later date, had the end not been hastened by hooping-cough; *two* sank from diarrhœa; *one* from pleurisy; *one* from scarlatina; and *one* from gastric fever.

"Hooping-cough, although succeeded in a few instances by an improved state of health and constitutional vigour, not unfrequently impairs the general tone, and entails for a time, a high susceptibility to several forms of disease. The most frequent of these are delicacy of the bronchial and portions of the alimentary mucous membrane, and morbid irritability of the respiratory and splanchnic nerves, with consequent disturbance of the functions which these nerves regulate. Bronchitis and other forms of pulmonary disease, in most instances pre-existing, formed a complication in 105 cases, and in not a few continued to exist for variable periods—weeks or months—after the neurotic affection had ceased. In several instances, after the lapse of three, six, or twelve months, during which the child was quite well, a relapse of hooping-cough came on, the paroxysms being equally severe and frequent as in the first attack; and in several others, attacks of spasmodic cough, recurring in paroxysms, but without hooping, came on from time to time during the six or twelve months following the cure of the hooping-cough.

"Diarrhœa and dysentery, in decided and severe forms, were complications in

44, and gastric affections, associated in some with stomatitis, in 17 cases; diarrhœa frequently constitutes, also, both a consecutive and recurrent disease during the first twelve months. Independently of its occurrence in decided form as a troublesome complication, diarrhœa not unfrequently assumed a somewhat different aspect. It sometimes came on, for instance, as though the result of remedies, at a time when these seemed to be acting most beneficially in relieving the cough and spasms, although the remedies used do not possess aperient properties.

"Muscular twitchings of the limbs and features, nervous palpitation, neuralgia, headache, spasmodic asthma, irritable stomach, with intolerance of solid ailment, forming slight degrees of chorea, are instances of nervous irritability following hooping-cough, and continuing more or less for a season."

Of the infectious nature of hooping-cough, Mr. Whitehead believes there can be no doubt.

In respect to treatment, he is convinced that when this is judicious in character, and commenced in the early stage of the attack, it is capable of moderating the predominant symptoms, warding off serious complications, and materially shortening the duration of the disease.

The remedies employed at the Hospital were, in simple cases, or when the complicated cases had been reduced by an appropriate treatment to this condition, Dover's powder alone, or combined with camphor, camphor inhalations, emetics, belladonna, and local irritants. Sometimes the Dover's powder was replaced by tincture of opium, given in camphor or other aromatic water.

"Belladonna," we are informed, "was used in 76 cases. It was given in form of powder of the leaves, never the extract, as this is an uncertain preparation, and sometimes in form of solution of the nitrate of atropia. When in the form of powder, half a grain, mixed with five grains of sugar, was given to a child twelve months old, twice a day—then, after two days, if well tolerated, three times, then four times a day or oftener, and in larger doses; being gradually increased until a specific effect was produced. The solution of nitrate of atropia was prepared so as to contain one ninety-sixth of a grain in a teaspoonful of the liquid—this dose of the salt is equal in its therapeutical effect to about half a grain of the powdered leaf, so that a teaspoonful of it may be given twice or thrice daily to a child twelve months old."

The symptoms indicative of *atropism*, as the specific effect of the belladonna is termed by Dr. W., are—dryness of tongue and fauces, with thirst, slight dyspnœa, redness and sometimes puffiness of the skin of the features, neck, and chest, occasionally, but not always, dilatation of the pupils, and now and then slight giddiness. It is not necessary, we are told, to push the remedy in all cases to this extent. In those who bear it well, and in whom atropism is speedily induced, the disease, even in its severest form, and in the stage of increase, is at once arrested, and, with due precaution, does not relapse. In several instances brought early under treatment, in which atropism was induced after a few days, the duration of the attack was reduced to twelve, sixteen, or twenty days.

"Of the 76 cases treated by belladonna, 9 were very irregular in attendance, the treatment being interrupted for a week or ten days at a time. In the other 67 cases, in some of which the attendance was also irregular, the average duration of the treatment was twenty-two days, giving a decided preference to this remedy. It is highly probable that were the belladonna treatment early adopted in each case, and associated with suitable hygienic regulations, the duration of the disease might be reduced from its average of forty-two days to that of twenty-eight or thirty days, and both its concomitant and consecutive accompaniments be materially lessened.

"The tolerance of belladonna is different in different subjects, and is probably as great in the young child as the adult. While a few half or quarter grain doses will suffice to atropise one, another will bear the article for a length of time in high doses, if augmented gradually. In a child four and a half months old, on the fourteenth day of the attack, a quarter of a grain was followed by alarming atropism. On the next day, the symptoms having subsided and the hooping being relieved, another such dose was given, and followed by symptoms still more violent than the first. Further trials were not made. In contrast with this, to a child two and a half years old the dose was increased from half a grain twice, to six grains five times a day—thirty grains daily—before a crisis was brought about.

"The diet of a patient labouring under hooping-cough should be carefully regulated. An error in this way is quite enough to aggravate or prolong the disease, or to cause a relapse after it has been absent many days. The aliment, whether animal, farinaceous, or vegetable, should be in the liquid or semi-liquid form, and such as is easily assimilated. The alimentary mucous membrane being in a highly irritable condition, the presence of solid food can with difficulty be tolerated, and often occasions great disturbance. A meal of solid food will often aggravate the paroxysms both in severity and frequency, and may induce a relapse after a cessation of several days or weeks. By a similar kind of sympathetic irritability, the presence of worms in the intestines will aggravate the symptoms or prolong the duration of hooping-cough almost indefinitely. In several instances in which the symptoms continued unabated unduly long, and where it was found that worms existed, the expulsion of these parasites was immediately followed by mitigation of the paroxysms, and speedy cure."

The observations presented in the report of Dr. Whitehead on the subject of syphilis in children—its phenomena, duration, and treatment—are replete with interest and instruction; had we not already occupied so large a space with our notice of the previous sections of the report, we should be induced to present a very full analysis of them.

We must pass over, also, the section of the report devoted to the women's department of the Hospital, and diseases treated there during the two years embraced in the report, with a mere notice of a form of uterine hemorrhage frequently met with in the patients of the institution, and the remedy Dr. W. has found most successful in its treatment.

In some cases the hemorrhage was in the form of menorrhagia, the periods being regular, but more or less prolonged, and the intervals attended with an exhausting leucorrhœa. In other cases, the periods of discharge were irregular—always too frequent and protracted—continuing from six to twelve days or longer, with an interval of five or ten days occupied by leucorrhœa. In a few the discharge lasted several weeks at a time, returning after a short interval of rest, and often when not expected—losing entirely its regular periodicity. All the patients were more or less anæmic, with great lassitude, pallor of skin, languid and enfeebled circulation, often jugular bruit and hysterical disturbances in various forms.

"The pathology of these cases," says Dr. W., "consists in vascular or spongoid hypertrophy of the uterus as a principal condition. The uterus, whether nomally placed or otherwise, was always too bulky; its lower section was expanded, its density lessened, its fundus, in some instances, could be readily felt above the pubis without pressure from below, and its depth was generally increased. The veins of the cervix, and no doubt those throughout the entire organ, were congested, one or more varicose knuckles being occasionally visible, constituting what has been called uterine piles. All the pelvic structures were relaxed. The hæmorrhoidal veins were often distended, and occasionally there was rectal flux, with or without rectal hæmorrhoids. Concomitant symptoms of hepatic disturbance were also not uncommonly present."

The remedy Dr. W. found most advantageous in these cases was the yarrow (*Achillea millefolium*). It was given in the form either of tincture or decoction. He states that the grounds upon which it is recommended as an anti-hæmorrhagic are not limited to the experience cited in the report before us. He has used it pretty freely in private practice for about three years, and the results now announced correspond with those derived from its previous trial. D. F. C.

ART. XV.—*Diseases of the Stomach, with an Introduction on its Anatomy and Physiology; being Lectures delivered at St. Thomas's Hospital.* By WILLIAM BRINTON, M. D., Fellow of the Royal College of Physicians; Lecturer on Physiology and on Forensic Medicine in St. Thomas's Hospital; Physician to the Royal Free Hospital. London: John Churchill, New Burlington St., 1859. 12mo. pp. 406.

As preliminary to a short notice of this work, we quote an extract from the author's preface:—

"The following lectures are published, in the hope that they will be found a brief but complete account of what is at present known concerning the diseases of the stomach.

"Fifteen years ago, the death of a near relative painfully impressed me with the obscurity and uncertainty which peculiarly attach to the maladies of the abdominal viscera. From that time I have given to these maladies whatever attention could be justifiably devoted to a special group of diseases by a student and practitioner of physic in general.

"Of the materials I have thus collected, those which form the basis of the following lectures are derived from sources so various, as to render the concord equally important with the number of the facts they represent. To the large opportunities offered me, during twelve years, as a dispensary and hospital physician, I have added whatever could be gleaned from a field of observation, the magnitude of which it is difficult to estimate. The hospitals and museums of various cities; the cases recorded by authors of various epochs and countries; and especially, the stores of information which are gradually accumulating in the journals, reviews, and transactions of the medical profession in the more civilized parts of the world—all have been laid under contribution; and have yielded me facts which (considering the price of human suffering paid for pathological knowledge) deserve a respect and attention I sincerely disclaim for the manner in which I have arranged and used them. To this general acknowledgment I must add my special thanks to numerous professional friends, and to hundreds of observers whose smaller contributions could not be separately quoted in the following lectures."

After the announcement, in such glowing terms, of the immense amount of material collected from so many and wide-spread sources, together with the time and labour bestowed on the subject, the reader must be surprised that the author is able to compress the results of his investigations into a duodecimo of 406 pages. An examination of the work, however, shows that the results are less than the tone of the preface would lead us to expect. The work can hardly be said to contribute much that is practically important, to our knowledge of the diseases of the stomach.

The first 44 pages are devoted to a summary of the anatomy and physiology of the stomach. The remainder of the work consists of six lec-

tures. The subject of the first lecture is the symptomatology of gastric disease. Circumstances connected with the examination of the stomach after death, and gastritis, are the subjects treated of in the second lecture. Lecture third is occupied with ulcer, and lecture fourth with cancer of the stomach. Several topics are considered in lecture fifth, viz: Cirrhotic inflammation or plastic linitis of the stomach; suppurative linitis; tumours; hypertrophy; atrophy, and dilatation, etc. The sixth and concluding lecture is devoted to the consideration of dyspepsia.

The lectures on ulcer and cancer of the stomach form the most valuable portion of the work. The statistics cited in these lectures, may be consulted with advantage. Ulcer of the stomach has been treated of by the author in a separate publication, from which is derived the greater part of the lecture on this subject. The author states that his account of the *symptoms* of gastric ulcer is based on facts obtained from two sources, viz: "The records of about 1200 cases, often affording a mere outline of the chief symptoms, but always verified by careful necropsy; and the personal study of more than 200 cases, affording minute details respecting symptoms, but only verified by necropsy in a small proportion of that number." We think we shall not incur the charge of being unreasonably sceptical, if we express surprise with regard to the occurrence of 200 cases of ulcer of the stomach in the clinical experience of any one practitioner, during the space of fifteen years, especially when it is stated that the diagnosis was verified by necropsy in but a small proportion of this number. The symptomatology based on the clinical study of these cases, we should not regard as entirely reliable. But the author candidly confesses that "the information derived from these two sources has shown none but negative discrepancies; in other words, none but differences chiefly explicable by the unavoidable omissions of such brief records."

The terms 'cirrhosis of the stomach,' or 'plastic linitis,' and 'suppurative linitis,' applied to forms of disease treated of in lecture fifth, are new, and are not likely to suggest to the mind of the reader the morbid conditions which they are intended by the author to designate. We quote the following account of typical specimens of the affection which he calls cirrhosis of the stomach.

"The necropsy of some obscure gastric disease of long standing shows a stomach which, even on our dividing the wall of the belly, strikes us as remarkably altered. Sometimes large, sometimes small, perhaps of average dimensions, it has a peculiar pearly whiteness and opacity; an appearance which is partially due to a dulness of the peritoneal coat, in remarkable contrast with its ordinary mirror-like brilliancy. Removing the organ for further examination, we find this change of colour associated with great increase in its weight and density; so that, for example, it has a hard gristly feel; and not only fails to collapse by its own weight, but resists a considerable pressure; or returns to its original shape on the removal of such pressure, like a large artery or a caoutchouc bottle. An incision through the coats of the organ exhibits a vast increase of its thickness: a change which, as it is diffused equally throughout the stomach, leaves the relative depth of vertical sections of different parts little affected; and is hence summed up by the statement that the thickness is some six or eight times greater than what is normal. But in spite of this thickening (which is often attended by an increased density that makes the pearly white section fairly creak while it is being traversed with the scalpel), the different gastric tissues remain not only discernible, but distinct from each other. Often, indeed, their adjacent boundaries are evidently composed of a looser tissue than that of the mass elsewhere; while even the proportionate thickness of the areolar, muscular, and serous coats sometimes approaches that of the healthy

tissues. The mucous coat, however, appears much less affected; its matrix being either little changed in thickness, or indistinguishably fused into the subjacent 'tunica nervea,' and its secretory structures remaining substantially healthy. Finally, the whole organ is comparatively bloodless: a condition which is not only in marked contrast with its normal state after death, but is, of course, most remarkable in the more vascular of its coats, to wit, the mucous membrane. A closer inspection of such a specimen shows that the abnormal character is not limited to a mere increase in thickness. However distinct the gastric coats, they are far from offering that contrast to each other which is characteristic of their healthy structure. Muscle, areolar tissue, matrix and mucous membrane are all unnaturally alike. All evidently owe their increased thickness to the presence of the same new substance; the uniform and interstitial deposit of which is one of the main characteristics of this gastric lesion."

We do not doubt the occurrence of a condition of the stomach such as the author describes. We have a specimen in which these appearances are strongly marked. In these cases the disease is generally considered as carcinomatous. The author is probably correct in regarding them differently, but we cannot think that the term cirrhosis, as applied to the affection, is a happy selection. It is a misfortune that this term came into use as applied to a peculiar affection of the liver; and writers have shown great unwillingness to follow Dr. Corrigan in his extension of the term to a particular condition of the lungs. We opine that the profession will not adopt its application to a gastric affection. Nor do we believe that the term *linitis* will be acceptable, as denoting inflammation of the areolar tissue of the stomach. This term (from the Homeric λινον, *rete ex lino factum*), with the addition of *plastic*, is employed by the author as a synonym for cirrhosis; and, with the word *suppurative* added, is applied to purulent infiltration of the gastric tissues. The latter he regards as an affection occurring consecutively to plastic linitis, the deposit being liquified by a suppurative process. Happily, these forms of disease are rare. The symptoms are not distinctive, and a diagnosis is hardly practicable.

We should be misapprehended, were it to be inferred from the tenor of the remarks introductory to this brief notice, that we consider Dr. Brinton's work as devoid of instruction. But we must confess to a feeling of disappointment, on comparing the actual practical information which the volume contains, with the author's representation of the pains which he has taken in preparing to make it instructive. It would be far more agreeable to bestow unqualified praise, than to express this sentiment. It is by no means essential to the usefulness of a work that it should contain much that is new or striking; and we should be less disposed to find fault, in the present instance, were it not that the style and method of the author are not always conducive to a very clear exposition of the subjects of which he treats.

A. F.

ART. XVI.—*Practical Observations on the Operations for Strangulated Hernia.* By J. H. JAMES, F. R. C. S., Consulting Surgeon to, and late Senior Surgeon of, the Devon and Exeter Hospital, Consulting Surgeon to the Exeter Dispensary. London, 1859. 8vo. pp. 95.

THE object of the author of this volume, as is stated in some preliminary observations, is, "to give, as briefly as possible, the result of his own experience, either as confirmatory of some, or as opposed to other, points of practice which may now be more or less in esteem, giving reasons for his opinions when they differ from those of others, and offering, in some instances, views which he believes to be new, though it is indeed difficult to say what is really so." The author himself is a surgeon of very considerable distinction; his book is evidently the work of a man possessing an excellent judgment and quite extensive experience; and it is upon a subject relative to which, notwithstanding all that has been written upon it, there are still many important points remaining unsettled.

Mr. James gives, in tabular form, *all* the cases in which he himself has operated for strangulated hernia; they are thirty-six in number, and it may be well to add that they run over a space of thirty-six years, the first operation having been performed in October, 1821, the last in May, 1858. They are divided into three separate tables—the recoveries, the deaths in private cases, and the deaths in hospital cases. The columns in the tables are headed—number of case, kind, age, sex, duration, strangulation, vomiting, constipation, tenderness of belly, tenderness of rupture, contents, bowels moved after the operation, and remarks. We would call attention to the fact, for reasons to be hereafter given, that no mention is made as to whether or not a truss had been worn, or as to what was the after dressing of the wound, and that the supposed seat of the stricture is not always stated.

Of the 36 cases operated upon by Mr. James, 24 were in hospital, 12 in private practice; of the latter, 6 died; of the former, 8; the total mortality, therefore, is 39 per cent. Most surgeons, we believe, will be disposed to regard this percentage as enormous, for we have again and again remarked that, generally, they are not accustomed to regard the operation for strangulated hernia as being attended with an amount of mortality greater than almost any other it falls to their lot to perform. One reason for this is, that almost all writers on the subject of hernia, until within comparatively a recent period, have spoken of the operation as an innocent one. One celebrated writer declares that it is only "a wound in the skin, the opening of a membranous sac, and the incision of an aponeurosis or of a membranous cord." Pott affirms that of fifty patients not one is lost when the operation is skilfully and properly performed. Boyer teaches that the operation is not dangerous in itself, and, when the issue is unfortunate, the death of the patient must be attributed to the inflammation and gangrene of the intestine rather than to the operation. One very sensible old writer, after remarking that he believes the universal notion of its innocence to be erroneous, argues against it on the ground that the viscera are exposed to the air and handled, which may probably be mischievous; that the thickened tunica vaginalis, the peritoneum, and the tendinous rings are laid open, and thickened membranes seldom digest but with some hazard; and then goes on to say: "But what is still a more convincing argument of its precariousness is, that many have

died after the operation, though performed long before the symptoms of an approaching mortification would probably have appeared."[1] This last argument, or the one drawn from experience, is the only one of any serious force whatever at the present day, when some surgeons would have the human system to digest everything, and hold it a trifle to open the belly from the sternum to the pubes. Let us see, then, what experience teaches in regard to the operation for strangulated hernia. Of 77 cases reported by Sir Astley Cooper, 36 proved fatal, or more than 46 per cent. Of 545 cases recorded in the journals, and collected by Dr. Turner, 260 are reported to have died, or nearly 48 per cent.[2] In the Paris hospitals, from 1836 to 1841, about five years, the disciples of Boyer—who, as just seen, teaches it not to be a dangerous operation—performed it 183 times; of these cases 114 died; 97 of these patients were from 50 to 80 years of age, and of these 70 died, or 72 per cent.[3] The results of Mr. James's operations compare therefore very favourably with any others we have access to, and the operation for strangulated hernia must be regarded as one of the most fatal in surgery.

A very considerable portion of Mr. James's little book is occupied with a discussion of the respective advantages of opening the hernial sac, or of leaving it intact, as in what is called Petit's method. We have been much pleased with the manner in which the matter has been argued, and particularly interested by the statistics, carefully criticized, that have been brought forward. There are, however, certain considerations, which we must deem of the highest importance, that have been passed over in silence, to our regret, and, in regard to one of them, we would add, to our astonishment. One great reason for not reducing the hernia without opening the sac—in fact, it is probably *the* great reason for not doing so—is, that the stricture, in certain cases, is situated in the neck of the sac itself, and the hernia is as much strangulated when within the abdominal cavity as when outside of it. This reason is not given by Mr. James. In entering upon the subject, Mr. James says: "The question naturally presents itself to every mind, why a method recommended by so great a surgeon as Petit, and supported by the opinion and practice of other eminent surgeons of his day, should have fallen into disuse, unless there were some cogent reason for it, founded on its ill success" (p. 5). The cogent reason is, that, not many years after Petit's operation came into general use, several surgeons found that in certain cases the symptoms of strangulation persisted after the reduction of the hernia, and autopsy showed the intestine strangulated in the sac, and by the neck of the sac itself.[4] Petit himself did not suspect that the intestine could be strangulated by the sac itself, as is readily seen by his manner of arguing in favour of his own operation, against the old one, called the operation of Franco, by which the sac was always opened. It was objected that his operation was difficult, but he answers that there is no question of difficulty when a thing is useful and possible; again, that the liquid of the sac would be emptied into the belly, where it would cause accidents, to which he answers that the taxis would do the same thing. As to making of his operation a general method, he declares that he has no intention of so doing; for, if he suspected the intestine to be gangrenous, or to contain any foreign bodies, he would open the sac for the purpose of examining.[5] There is no

[1] A Critical Inquiry, &c., by Samuel Sharpe, 2d edition, London, 1750, p. 18.
[2] The Science and Art of Surgery, by Erichsen, Am. edit., p. 728.
[3] See Malgaigne's memoir in the Archives Gén., 3e séries, vol. xii. p. 206.
[4] De l'Étranglement dans les Hernies, &c., par Broca, Paris, 1853, p. 94.
[5] Traité des Maladies Chirurgicales, Paris, 1790, vol. ii. p. 329 et seq.

question made anywhere as to a strangulation in the neck of the sac, which, as said before, is a discovery of later date. The surgeon at the present day, however, who should reduce a strangulated hernia without considering whether the stricture might not be at the neck of the sac, would not be giving his patient as good a chance of recovery as he ought to be desirous and able to do. It is on this account we called attention to the fact that, in his history of the cases, Mr. James never mentions whether or not a truss had been worn by the patient. When a truss has been worn, its pressure may have caused the formation of a neck to the sac, and the stricture may be there. Malgaigne, in his celebrated memoir on the subject, denies that strangulation is ever produced by the fibrous orifices through which the sac passes; and though this may be an extreme opinion, it is not, practically, so dangerous an one as that which ignores totally all strangulation except from these orifices. As respects the seat of stricture, in all the cases of femoral hernia Mr. James states that he found it corresponding with the edge of Gimbernat's ligament (p. 26), in inguinal hernia it is but rarely mentioned, and the internal and external rings, on different occasions, are both accused. It is curious to notice that while French surgeons almost invariably find the stricture at the external ring, the English, on the other hand, find it at the internal. Has not the fact that the internal abdominal ring was discovered by Sir Astley Cooper had much to do with the belief now prevalent in England? After all, all the surgeon can be sure of, in regard to the general seat of stricture in strangulated hernia, is, that he knows but little, with any certainty, in regard to it, but that the little he does know should prevent him from practising, as a general rule, Petit's operation, or returning the sac without having made himself sure that the stricture is not seated at the neck.

Mr. James not only believes that the fibrous rings are always the agents of constriction in strangulated hernia, but he believes, moreover, that they are *active* agents—that the constriction they exert is an active constriction. Opinions to the contrary he declares to rest more on assumption than absolute proof. "It is said that the ring itself is not muscular, therefore it cannot contract; but do no parts contract which are not muscular? A name often blinds us to facts. We have been long accustomed to connect contractile power with muscular structure, but let us take another case of strangulation, that of the glans penis in paraphymosis; the stricture here is undoubtedly caused by common integuments" (p. 29). General anatomy would readily point out the reason why the action of a fibrous ring should be very different from that of the common integuments, for in the latter muscular fibres are contained in abundance, in the former there are none. Only two additional arguments are mentioned in favour of the opinion that the constriction is active, one is the great difference there is in the degree of constriction in different cases, the other the great difference between the feel of the edge in the dead subject and in the hernia. The force of these arguments seems to us to be very doubtful. In some short observations upon the use of chloroform (p. 15), it is said that the opinions of those who do not allow any contractile power to the stricture must be rendered doubtful by the fact of its serving, for it must be mainly by relaxing the stricture, and the resistance of the abdominal muscles. The resistance of the abdominal muscles is certainly a very powerful agent in preventing the return of the protruded bowel, for, in contracting, they diminish the capacity of the abdominal cavity. Pressure exercised upon the tumour, in endeavouring to return the bowel by taxis, by causing pain,

augments the contraction of the muscles, and increases their resistance. Anæsthetic agents act by diminishing or entirely suspending the contraction of the muscles of the abdomen. This action of the abdominal muscles should be properly understood, for, in supposing them to act by narrowing the fibrous rings, surgeons compel their patients at times to assume positions not calculated to increase the size of the abdominal cavity.

The fact that the action of the rings is passive, and not active, is one of infinitely more importance than might be supposed by one who has not reflected seriously over the problems presented by what is styled *strangulated* hernia. Since the rings are passive, the hernial mass must increase in size in order to be strangulated, otherwise whatever came out of the opening would certainly go in again. The return of the bowel is prevented by a certain lesion that has occurred therein after the protrusion, and this lesion is a congestion of blood. If the opening be narrow, the slightest increase in size is sufficient to strangulate the bowel; if more considerable, a greater tumefaction is necessary; if very great, the swelling must be enormous. It is not our design to treat this subject at length at the present time; but, in order to illustrate our meaning, we will take a case from those styled *strangulated* in Mr. James's book, and make a few observations upon it. The case we select is No. 6 in the first table. "A man, 67 years of age; the hernia old; strangulation had lasted seven days; evacuation before the operation, probably accounted for by the stricture not being very tight, and the reduction prevented rather by the bulk of the cæcum than by the tightness of the stricture; belly tender; rupture tender; contents, cæcum and appendix; bowels moved the following day;" and, it is added, in the *remarks*, "notwithstanding the length of time strangulation had existed before admission, the symptoms were not urgent, and a warm bath was tried; that failing, the operation. The contents, cæcum and appendix, and a good deal of fluid at the bottom. The intestine was a lively red, showing that the stricture was not so tight as to prevent a free circulation, and there was a fur of lymph on the surface. The reduction was rendered difficult rather by the bulk of the cæcum than the tightness of the stricture." Now, is it proper to call this a case of *strangulated* hernia? As Mr. James himself says, in the sentence we quoted from him a moment since, "a name often blinds us to facts;" we call a disease strangulated hernia, and hasten to divide a stricture; if we called it *inflamed* hernia, would we not rather endeavour to diminish the inflammation by local and general measures, and then, when the inflammation shall have subsided, if the hernia be reducible, endeavour to return it to its normal position? It does not require much reflection to perceive that this question is not one of mere words, nor one of solely pathological interest, but a question that interests most deeply the life of the patient. Statistics already given have shown us that the operation for strangulated hernia is one of the most fatal in surgery, and we believe that the correct view of the question before us will spare many men the risk of its dangers.

In connection with the subject of the operations for strangulated hernia, it is curious to remark the retrograde movement which is being made at the present day by some rather prominent surgeons in various countries. The performance of operations for the radical cure of hernia is being again attempted, as was done in former times, before the invention of the truss. It is true that invagination and an injection of iodine are improvements upon the *punctum aureum* and the royal stitch; yet their performance at the present day must be regarded as unnecessary, and therefore as reprehen-

sible. By the most successful methods of operating, it is shown that death occasionally results, and this is quite sufficient to render the attempt unjustifiable. In place of publishing their statistics with pride, surgeons should be ashamed of them. How different is the manner in which Petit recounts the cases in which he attempted the radical cure of hernia! Although he lost but one patient, he cannot forgive himself. Surgery, at the present day, may have advanced so far as perfection of method is concerned, but the great moral principles by which operators should be guided do not seem to be so well understood nor so well regarded. At all events, notwithstanding all the modern improvements in operations for the radical cure of hernia, we must still exclaim with Petit, speaking of the truss, "on peut dire avec verité, que ce moyen d'assujettir les parties est un des plus grands présens que l'art ait fait à l'humanité." W. F. A.

BIBLIOGRAPHICAL NOTICES.

ART. XVII.—*Reports of American Institutions for the Insane.*

1. *Of the Maine Insane Asylum, for* 1858.
2. *Of the Massachusetts State Hospital, at Worcester, for* 1858.
3. *Of the Massachusetts State Hospital, at Taunton, for* 1858.
4. *Of the Massachusetts State Hospital, at Northampton, for* 1858.
5. *Of the Northern Ohio Lunatic Asylum, for* 1857.
6. *Of the Central Ohio Lunatic Asylum, for* 1858.
7. *Of the Southern Ohio Lunatic Asylum, for* 1858.
8. *Of the Hamilton County (Ohio) Asylum, for* 1858.
9. *Of the Michigan Asylum, for* 1857–58.
10. *Of the United States Government Hospital, for* 1858.
11. *Of the Insane Asylum of North Carolina, for* 1857 *and* 1858.
12. *Of the State Lunatic Asylum of South Carolina, for* 1857.
13. *Of the Mississippi State Lunatic Asylum, for* 1857.
14. *Of the Insane Asylum of Louisiana, for* 1857 *and* 1858.
15. *Of the State Lunatic Hospital of Texas, for* 1857.
16. *Of the State Insane Asylum of California, for* 1857.

1. THE Report of Dr. Harlow, Superintendent of the *Maine Insane Asylum*, contains the subjoined information in regard to the patients during the fiscal year terminating with the 30th of November, 1858 :—

	Men.	Women.	Total.
Patients at the beginning of the year . . .	118	90	208
Admitted in course of the year	72	54	126
Whole number " "	190	144	334
Discharged, including deaths	73	53	126
Remaining at the end of the year . . .	117	91	208
Of those discharged, there were cured . .	37	22	59
Died	10	14	24

Died of consumption, 6; marasmus, 4; exhaustion, 3; continued fever, 3; congestion of the brain, 2; disease of the heart, 2; dropsy, 1; paralysis, 1; diarrhœa, 1; epilepsy, 1.

No epidemic disease appeared in the course of the year. "The number of patients has never been larger. Early in the summer the male department was filled to its utmost limit, obliging us to delay the admission of new patients until vacancies should occur."

"Among the many pathological conditions of the physical system connected with insanity," remarks Dr. Harlow, "there is none more common than a deranged state of the stomach and bowels. Rarely do we meet an insane person in whom we do not find an irregular appetite, indigestion, and constipation. Not unfrequently these symptoms exist for a long time previous to the development of mental disturbance, and are, as we believe, among its primary causes, which, with early attention and proper treatment, might be removed, and save the individual from becoming an unfortunate victim to this disease. * * * Nothing tends so much to change the stomach from a normal to an abnormal condition, as the present dietetic habits of our people; and, as the brain is in immediate connection and sympathy with the stomach, its effect upon the former is obvious. * * * Certain it is that the manliness and comfort of continued intellectual strength—the normal perception and virtue of the mind, depend upon a proper physiological diet." He quotes from Dr. Abernethy—"I tell you honestly what

is the cause of the complicated madness of the human race: it is their gormandizing, and stuffing, and stimulating the digestive organs to excess, thereby producing nervous disorder and irritation;" and then proceeds: "The foundation of gastric disease is not unfrequently commenced in childhood, by the use of highly concentrated and improper food. The common practice of feeding children with aliment scarcely fit for the stomach of an adult, deserves the careful consideration of all parents. Its effect on the mental and physical growth of the child is greater than is generally imputed to it. Much of the feeble health so prevalent at the present day, may be traced to improper habits of diet." Of tobacco, he says: "Its pernicious effect upon the brain and nervous system is obvious to all who are called to treat the insane. A large class of our patients have been inveterately addicted to its use, and in many cases it has been a prominent cause in developing the disease."

Patients admitted since the hospital was opened, in 1840	1,978
Discharged cured	813
Died	250

A benevolent person has left a legacy to the institution for the purpose of forming a library for the patients, and during the past year a part of the fund has been expended in the purchase of upwards of six hundred volumes. Near the close of the report, there is a list of about thirty newspapers and periodical publications which are sent to the hospital gratuitously.

2. Since the opening of the new *State Lunatic Hospital* in Massachusetts, there has been a general transfer of patients, so that each of the three hospitals will, as far as practicable, have the care of those whose residence is within that section of the State in which it is situated. The Report of the *Hospital at Worcester*, contains the subjoined account of these transfers, so far as that institution was concerned.

	Men.	Women.	Total.
Removed to the Hospital at Northampton, August 16th, Sept. 20th, and Sept. 30th, 1858	67	75	142
Removed to the Hospital at Taunton, Sept. 2d, 1858	3	4	7
Whole number removed by transfer	70	79	149
Received from the Hospital at Taunton, Aug. 30th and Sept. 17th, 1858	21	37	58
Received from the Boston Lunatic Hospital	12	19	31
Whole number received by transfer	33	56	89
Diminishing the numbers at Worcester	37	23	60

These admissions and discharges are included in the following table of statistics for the period covered by the report.

	Men.	Women.	Total.
Patients in the hospital, December 1, 1857	177	195	372
Admitted in ten months	142	165	307
Whole number	319	360	679
Discharged, including deaths	180	196	376
Remaining September 30, 1858	144[1]	160[1]	301[1]
Of those discharged, there were cured	55	72	127
Died	18	16	34

Causes of death.—Consumption, 6; epilepsy, 6; palsy, 6; marasmus, 5; old age, 3; typhomania, 3; meningitis, 2; asthma, 1; pneumonia, 1; typhoid fever, 1.

"In the spring there were several cases of fever. During the summer and autumn there has been severe diarrhœa and dysentery, generally of a mild character, and yielding to proper remedies. * * * Three persons died within the ten months which this report embraces, who were more than eighty years of age. Four were between the ages of 70 and 80 years, and six between the ages of 65 and 70 years. * * * Two patients died within thirty-six hours after admission."

[1] According to the preceding numbers, these three items should be 139, 164, 303.

The difficulties and the annoyances consequent upon the association of patients of foreign birth with those who are natives of America, have in several instances been portrayed in the reports emanating from our establishments for the insane. The means adopted at the Worcester Hospital to avert these evils, and the results of the course pursued are thus noticed by Dr. Bemis:—

"During the last year a complete separation has been maintained between the foreign and native patients, much to their mutual satisfaction and benefit. The foreign patients have the same comforts and accommodations, the same grade of attendants, and receive the same care and attention that native patients do. But looking at the welfare of the patients, there seemed to be good and sufficient reasons for a separation. When in health they separate themselves. They have but few feelings in common with each other. Opposite in religion, and all the notions of social life, it would not be well to class the two races in the same wards, where each must bear from the other what was considered troublesome and offensive while in health."

From its commencement the hospital at Worcester has been one of the most conspicuous in the United States, in regard to the extent to which patients have been employed in useful manual labour, both within doors and without. On the other hand, but few institutions have been supplied with more numerous resources for recreation and amusement, or have more extensively and systematically made use of them. Among these are mentioned—riding, walking, cultivation of flowers, care of pets, birds, &c., parties, dancing, music, cards, draughts, dominoes, graces, battledoor, ball, cricket, quoits, books, maps, newspapers, pictures, and the magic lantern. Among the prospective aids in the moral treatment are, a green-house, reading-room and museum, billiard tables, and a calisthenium.

This report is distinguished by one feature which, so far as we recollect, has not been presented by any other publication of the kind in the United States. We allude to a summary of the pathological appearances of all the cases in which a *post-mortem* examination was made during the period embraced by the report. Of these, in the present instance, there were thirteen. We desire to call attention to three of them in regard to their bearing upon a recent attempted definition of insanity, which has been promulgated with the intention of furnishing a test in cases of alleged mental alienation in persons accused of felony.

	Duration of insanity.	Cerebral membranes.	Cerebral substance.
Case 1st.	One year.	No unusual appearance.	Healthy to appearance.
Case 4th.	Twenty years.	Nothing unusual.	To appearance perfectly healthy.
Case 12th.	Three weeks.	Apparently healthy.	Not changed.

Disease of the brain is the essence of the definition alluded to; and its availability, as a test in medical jurisprudence, depends upon the existence of external physical signs or symptoms which are pathognomonic of cerebral disease. Here, however, of thirteen cases, we have three in which no lesion of the brain was manifest even upon inspection. We would simply ask if, under such circumstances, there be any physician who, in a case where life is at stake, would swear that there was no insanity, because he could not detect physical symptoms which, in his view, are pathognomonic of encephalic disease?

3. The most important numerical results contained in the report of the *Massachusetts State Lunatic Hospital*, at Taunton, for the fiscal year ending September 30, 1858, are as follows:—

	Men.	Women.	Total.
Patients at the commencement of the year	177	150	327
Admitted in course of the year	120	103	223
Whole number	297	253	550
Discharged, including deaths	141	108	249
Remaining at the end of the year	156	145	301
Of those discharged, there were cured	52	32	84
Died	25	15	40

Deaths from phthisis, 17; maniacal exhaustion, 4; paralysis, 4; diarrhœa, 4; softening of the brain, 3; apoplexy, 2; anæmia, 2; epilepsy, 2; fever, 1; chronic mania, 1. "The four fatal cases of diarrhœa were all of a chronic character, occurring in demented patients, and depending partly on the original disease in the nervous centres, and partly on the habits of the individual."

In respect to the causes of insanity, Dr. Choate says: "The number of cases arising from intemperance, that most prolific of all causes, has somewhat diminished during the past year; while those from religious excitement have considerably increased." The labour and the anxiety consequent upon an endeavour, by a large portion of our population, to improve their condition and elevate their social position; and the "unwise system of educating the young," are specially mentioned as powerful agents in preparing the brain and the nervous system for an easy invasion of mental disorder.

Of the 223 patients admitted, 100 were foreigners. The proportion of the latter class is less than in the last preceding fiscal year.

"No criminals have been sent to us (this year) from the correctionary institutions. * * * I cannot but cherish the hope, that in Massachusetts the last criminal has been removed from her State prison, to find a place among her respectable but unfortunate insane."

"In the large majority of curable cases, all visits of friends do harm, and retard the cure. And yet it is often extremely difficult to forbid them, and to withstand firmly the appeals of affection and kindred, without appearing hard-hearted and unfeeling. There is, however, but one course for a conscientious physician to pursue."

"At times, considerably more than one-half of the female patients have been employed, usefully to themselves and profitably to the institution."

"Happiness is not rare in a lunatic hospital, and the cases of content and supreme felicity are frequent enough to bring up the sum of enjoyment, among the insane, not to the same average as among the sane, but to a less distant approximation to it than is generally supposed. The sound of merriment, the game pursued with eager zest, the music and the song, the dance, and the gay jest and repartee, which may be seen and heard in our halls, are evidences of enjoyment which show that an all-wise Creator, in afflicting his creatures, has still left them not wholly without solace."

As bearing upon the question of the influence of marriages of consanguinity in the production of mental disorder among the offspring, Dr. Choate remarks that "the fact that the island of Nantucket, containing a population of eighty-five hundred, and isolated in a measure from the rest of the world, where circumstances of position and convenience must have made such intermarriages exceedingly common, has sent but two patients to this institution during a period of five years, would seem to show that this cause has less influence in the production of insanity than it undoubtedly has in that of idiocy, and impairment of the senses of sight and hearing."

4. The third *State Lunatic Hospital of Massachusetts*, under the superintendence of Dr. William Henry Prince, was opened for the reception of patients, on the 16th of August, 1857. This establishment is about one mile westwardly from the centre of the town of Northampton. The farm contains one hundred and seventy-five acres. The hospital is nearly in the centre of it, upon a commanding elevation. "It is protected on the north and northeast by a dense grove, but has on the east and southeast an extensive open lawn, over which is an unobstructed view of the town of Northampton, and the Holyoke range of mountains, of the broad meadows bordering on the Connecticut River, and the town of Hadley on the opposite bank; and beyond, and higher up the hill-side, of Amherst, and its college buildings." The ground-plan is the broken linear, consisting of a central edifice and three wings upon either side.

The building is of brick, the roof slated; the style of architecture that which is known as the Elizabethan. The number of rooms appropriated to patients and their immediate overseers is two hundred and ten. Six of them are associated dormitories, with ten beds each, and six others have each two beds. Two hundred and fifty patients can be comfortably accommodated, and the

arrangements are such that those of each sex can be separated into twelve classes. The building is lighted by gas, heated by steam, and forcibly ventilated by a wheel fan. It is supplied from the adjacent river with water, which, propelled by a forcing-pump, is received by tanks in the attic, the united capacity of which is upwards of twenty thousand gallons. "With our elevated situation," says the report, "dry soil, good drainage, good water, good ventilation, and freedom from crowded halls, we should be exempt from the attacks of those epidemics which are so often the scourge of hospitals differently situated in these respects."

The opening of this institution was the signal for a hegira of patients from some of the other similar establishments in the State. On the 16th of August fifty one were removed to it from the hospital at Worcester; on the 7th of September, sixty-eight from that at South Boston; on the 20th of September, sixty-three, and on the 30th of the same month, twenty-eight, from that at Worcester. Meanwhile, eighteen patients had been received from other sources. Thus, in the short time of forty-six days, the building became peopled with 228 insane persons, most of them transported in large numbers and without accident. Of these patients, the mental disorder of only thirteen was of less duration than one year. The prospect for the recovery of many of them is consequently discouraging.

The report before us is dated on the 30th of September, the day upon which the last instalment of patients was received from Worcester. Eight patients, 6 males and 2 females, had been discharged. No one was cured, and no one had died. The number remaining was 220, of whom 93 were males, and 127 females. Of the number admitted, only 56 were Americans. The others were, Irish 160, Germans 6, English 3, Scotch 1, Italian 1, Portuguese 1.

No mechanical apparatus for restraint had been placed upon the body or limbs of any patient. The various resources for moral treatment were being introduced. Religious exercises on Sunday, and on the evening of each week-day, had been established. A library was commenced, and had received several donations of books. The means for various games had been supplied. Many of the male patients had been employed upon the farm, and many of the females in the various departments of domestic labour.

5. The general items of the medical record of the *Northern Ohio Lunatic Asylum*, for the fiscal year terminating with the close of October, 1857, are as follows:—

Patients in the asylum October 31, 1856	141
Admitted in the course of the year	140
Whole number	281
Discharged, including deaths	133
Remaining, October 31, 1857	148
Discharged, cured	75
Died	4

"Our amusements," remarks Dr. Hopkins, "have been varied. Dancing, lectures, plays, and concerts have alternated. The chaplain has continued his ministrations on the Sabbath, and conducted the family worship during the week-day evenings. Attendance upon these services is entirely voluntary."

A subject which has already occupied our attention, in the progress of these *notices*, is discussed in the report now before us. We allude to the abuse of institutions for the insane by making them the receptacles of criminals alleged to be insane. "The first intimation," says the report, "we have of the fact that their removal from the penitentiary is contemplated, they are at our doors; and even though every bed in every ward may be full of the most deserving cases, we must receive them, and order the discharge of some unfortunate, but not vicious, one or more to make the required room. Nor is this an idle picture. Soon after the date of the last report, three convicts were sent us from the penitentiary at Columbus, said to be insane. Of their coming I knew nothing until they landed at our door. The house was already crowded as full as comfort would dictate, but room must be found for them. One of them I was pretty

well satisfied, after watching him a few days, was only simulating disease, and in this opinion I was confirmed at the end of two weeks by his successful effort to escape. I subsequently learned he had played the same game, once at least, before, in another State. The other two are doubtless insane, the victims of masturbation. One of them, being of that impulsive character so common to that class, once made an unsuccessful attempt upon the life of an attendant. As usual with them, this attempt was entirely unprovoked and unlooked for."

We have always believed that the admissions of strangers, in any considerable numbers, as casual visitors to the halls occupied by patients, is productive of injury, unrelieved by any adequate compensative good. It would appear from the subjoined extract, that the experience of Dr. Hopkins has not led him to the same conclusion.

"That the community might become familiar with the real character of the asylum, we have permitted, and indeed encouraged, pretty free visiting of the house. In no instance has any evil resulted to patients from this source. The people feel that it is their house, and none know how soon they may want its protection for themselves or family; hence the more familiar with its character the less reluctance to availing themselves of its care."

Yes, the people *do* "feel that it is their house," but do they also feel that if they themselves, by an unfortunate necessity, were confined in it, they would like to be stared at by every person whom an idle curiosity might induce to enter its halls?

6. In reading the report for 1858, of the *Central Ohio Lunatic Asylum*, at Columbus, we have been forcibly impressed with the conviction that its present official authorities are sincerely and actively engaged in the endeavour to make it as nearly perfect as, with the means at their disposal, and the architectural arrangements of a building erected prior to the development of the many improvements of the last twenty years, will permit. Judging from their record of what has been done in the course of the past year, the details of which are so numerous as to forbid the recapitulation of them in this place, the work of regeneration goes bravely onward. May the shadows of those officers never be less!

	Men.	Women.	Total.
Patients in the Asylum, November 1st, 1857	119	140	259
Admitted in course of the year	86	89	175
Whole number	205	229	434
Discharged, including deaths	68	111	179
Remaining Nov. 1, 1858	137	118	255
Of those discharged, there were cured	40	61	101
Died	10	9	19

It appears that the moral treatment of the patients is conducted with activity and efficiency. Religious exercises in the chapel are continued daily. These exercises are mentioned by Dr. Hills as being useful in promoting propriety of deportment, which is an aid in giving the patient encouragement, confidence, and self-respect. "A large portion of the insane are conscious that something is wrong with them. This is often the case when they do not admit it in language; and the consciousness of having behaved properly brings with it the conviction that an effort on their part has succeeded, and may succeed at other times."

As "the books once accumulated have mostly disappeared," an appropriation of one thousand dollars is requested for the purchase of a library for the use of the patients. Sixty-three newspapers and periodicals, published in various parts of the State, are received gratuitously. Illustrative apparatus having been purchased, a course of lectures was commenced in the autumn, with the design of continuing them, once in each week, through the winter. One evening in each week is also devoted to "a mixed entertainment of music and dancing." Most of the farm labour is performed by patients. The products of the farm, the past year, are valued at $1,665. "In the laundry and sewing-room the female patients have been actively and beneficially engaged as heretofore; and in the halls a large amount of work is accomplished, and a commendable

spirit of rivalry frequently exists between halls, in plain and fancy sewing, knitting, quilting, &c. This spirit of cheerfully contributing, by industry, to the general welfare of the household, is very much dependent upon the spirit of the attendants. The feelings of the patients thus become the index of the disposition of the attendants. So true is this, that when we find a class of patients becoming negligent, and finally averse to industrial pursuits, we know at once where to look for its source." In the course of the year, 3991 articles of clothing and of household linen were made.

The Central Asylum received its first patients on the 30th of November, 1838. This report is dated on the 1st of November, 1858. The intervening period was twenty years, less twenty-nine days. Dr. Hills has very properly seized the occasion to make a numerical summary of all the cases which have been treated in the Asylum. The most important information thus derived is copied below.

	Men.	Women.	Total.
Whole number of patients admitted	1680	1620	3300
Discharged recovered	835	852	1687
Died	244	184	428
Admissions in spring			811
" summer			820
" autumn			922
" winter			747
Deaths in spring			103
" summer			133
" autumn			92
" winter			100
Single			1475
Married			1612
Widowed			209
Unknown			4
From 20 to 30 years of age when admitted			1208
From 30 to 40 " "			915

Of patients between 40 and 50 years of age, at the time of admission, the recoveries were 56.09 per cent.; between 20 and 30 years, 51.77 per cent.; between 30 and 40 years, 50.63 per cent.; between 50 and 60 years, 47.16 per cent.; under 20 years, 45.17 per cent.; between 60 and 70 years, 40.62 per cent.

Causes of death.—Consumption, 72; inflammation of the lungs, 11; chronic inflammation of the bronchia, 1; hydrothorax, 4; paralysis, 8; paralysie générale, 5; apoplexy, 17; epilepsy, 34; organic lesions of the brain, 12; inflammation of the brain, 2; acute mania, 1; maniacal exhaustion, acute, 30; maniacal exhaustion, chronic, 10; typhomania, 6; inflammation of the pericardium, 2; disease of the heart, 4; inflammation of the stomach, 3; diarrhœa, 35; dysentery, 32; ulceration of the bowels, 3; organic disease of the stomach, 1; hemorrhage from the bowels, 3; inanition, 26; marasmus, 29; atrophy, 5; exhaustion and general decay, 3; dropsy, 5; chronic inflammation of the peritoneum, 3; inflammation of the liver, 3; bilious colic, 1; fever, 23; anæmia, 6; confluent smallpox, 1; erysipelas, 3; cutaneous cancer, 1; cancer of the womb, 1; inflammation of the kidneys, 1; gangrene of the face, 1; caries of the vertebræ, 1; exhaustion from journey, 2; suicide, 9; cause not assigned, 2.

7. Dr. McIlhenny, of the *Southern Ohio Lunatic Asylum*, gives the following record of the movement of the patients at that institution during the fiscal year terminating November 1, 1858.

	Men.	Women.	Total.
Patients at the beginning of the year	77	84	161
Admitted in the course of the year	62	54	116
Whole number	139	138	277
Discharged, including deaths	58	59	117
Remaining at the end of the year	81	79	160
Of those discharged, there were cured	41	32	73
Died	7	10	17

Causes of death.—"Mania," 4; apoplexy, 3; epilepsy, 2; pharyngeal abscess, paralysis, measles, disease of kidney, valvular disease of heart, pulmonary consumption, old age, and pneumonia, 1 each.

"The patient who died of pneumonia was brought to the institution in the last stage of that disease, totally unconscious of everything around her, and with well-marked muttering delirium. She survived the journey hither only a few hours."

Twenty of the patients received in the course of the year had attempted suicide prior to admission. The means employed, together with the number resorting to each, are as follows: jumping from windows, 2; poison, 3; drowning, 4; starvation, 2; suspension, 4; cutting throat, 4; burning, 1; strangulation, 1.

"The proper keeping of the criminal insane is a subject of more interest, perhaps, than many suppose. When a criminal is declared insane, it becomes the duty of the Governor to cause the removal from the State prison to one of the lunatic asylums. The association of this class of persons with the other patients in the hall, we have found to have a very unpleasant effect upon both."

Twenty-five newspapers are sent gratuitously to the asylum. In the course of the past year a reading-room was prepared, in which the best of these publications are kept on file, and to which many of the patients resort. "Our present stock of books," remarks Dr. McIlhenny, "is so small that I am ashamed to be compelled to tell visitors that it is the offspring of the great State of Ohio."

In this report, as in the similar recent publications of nearly all the American institutions for the insane, there is an acknowledgment of the receipt of pictures from that persistent friend and benefactor of the sufferers from mental disorder, Miss D. L. Dix.

"It has been our constant care and desire to employ as many patients as possible in some kind of daily labour. Besides those who worked upon the grounds and in the garden, a considerable portion of the male apparel has been made by tailors who were patients in the house. Much of the repairing in and about the house has also been done by carpenters who were inmates. Quite a number of females daily spend a few hours in the sewing-room, where, with the assistance of one sewing girl, we have been able to manufacture the necessary articles of clothing for the greater part of the house."

An appropriation of one thousand dollars is requested for the purpose of erecting a workshop, in which carpenters, tailors, and shoemakers can be employed.

8. The subjoined numerical results at the *Hamilton County* (Ohio) *Lunatic Asylum*, are taken from the report of that institution for the last fiscal year.

	Men.	Women.	Total.
Patients in the asylum, June 5, 1857 . . .	84	95	179
Admitted in course of the fiscal year . . .	98	60	158
Whole number	182	155	337
Discharged, including deaths	70	37	107
Remaining June 5, 1858	112	118	230
Of those discharged, there were cured . .	36	10	46
Died	7	5	12

Causes of death.—Phthisis, 4; exhaustion of mania, 2; typhoid fever, 2; congestion of brain, 1; delirium tremens, with pneumonia, 1; epilepsy, 1; suicide, 1.

"Erysipelas at one time made its appearance in one of the male wards, and for a time assumed rather a threatening aspect, but it soon subsided without producing any fatal effects. With this single exception, we have had no disease prevailing in an epidemic form. Most other cases of sickness were of those adynamic forms of disease always incident upon large collections of old and debilitated persons, in crowded and badly-ventilated apartments."

Of the patients discharged, thirty-one were removed to the asylum at Dayton; and of those admitted, twenty-one incurables were returned from two of the State institutions—seven from that at Dayton, and fourteen from that at Columbus.

Dr. Mount very properly remarks: "It could not be expected that from a county asylum like ours, filled up as it is with idiots, imbeciles, and lunatics that have for years been accumulating upon the county, and is still the receptacle for all cases returned as hopeless from our State institutions, making it rather a retreat for the incurable than a hospital for the treatment of recent cases, that a very large percentage of cures would be effected."

This asylum was established, as a separate institution, but about five years ago. The patients are placed in temporary buildings, pending the erection of a permanent edifice which has been commenced. For these reasons the establishment has not attained that excellence in the detail of appliances and means of treatment which are found at our first-class institutions. Dr. Mount mentions "weekly music and dancing parties" as the only source of amusement for the patients. He thinks that these have been "attended with manifestly good results." "The only books," says the report, "our patients get to read, are supplied from the private libraries of the officers of the asylum, and for the newspapers published in our own county, we pay the usual subscription price." The latter assertion is in striking contrast with the fact that in the reports of most of the public institutions, long lists of papers sent to them gratuitously are published.

"As we have a larger number of inmates," continues the report, "than any similar institution in Ohio, we hope our benevolent citizens engaged in dispensing books, tracts, papers, and other reading matter, whose beneficence, scorning the narrow limits of our own State or country, extends to foreign climes, may not forget the old but very trite maxim, that charity begins at home; and while the inhabitants of 'Borrioboola Gha, on the left bank of the Niger,' are well supplied, this unfortunate class of persons at home may not be altogether overlooked."

	Men.	Women.	Total.
Whole number of patients since the asylum was opened	418	331	749
Discharged, cured			183
Died			60

9. It is eleven years since the government of Michigan authorized the establishment of an institution for the insane in that State. We have already given a description of the farm which was purchased for the purpose, at Kalamazoo. The building was commenced five years ago. In the report now before us, the trustees assert that "when finished, no other institution in our country will be provided with more perfect facilities for the complete classification of its patients, and the entire separation of the sexes." We believe that all persons conversant with the subject who have examined the plan of this hospital, agree in the opinion that it is one of the very best in America. A portion of the department for men, sufficiently commodious to receive ninety patients, has been completed, and it is determined to open this part, for the reception of men alone, before the remainder of the edifice is finished. Dr. E. H. Van Deusen, formerly assistant physician at the Utica Asylum, assumed the active duties of the office of superintendent of this institution, in October, 1857, "in order to supervise its internal arrangements, and to assist and advise in preparing for its opening."

The completion of the whole edifice has been delayed by one of those untoward accidents which the most assiduous watchfulness and care cannot always prevent. On the evening of the 11th of February, 1857, the main, or central building was destroyed by fire.

10. The report before us from the *U. S. Government Hospital for the Insane*, embraces the official year which terminates with the 30th of June, 1858.

	Men.	Women.	Total.
Patients in the hospital at the beginning of the year	60	50	110
Admitted in course of the year	29	14	43
Whole number	89	64	153
Discharged, including deaths	24	12	36
Remaining at the end of the year	65	52	117
Of those discharged, there were cured	13	5	18
Died	7	6	13

Causes of death.—"Chronic organic and functional degeneration of the brain, irregular in character and extent, 4; the same, with fistula in ano, 1; with phthisis, 5; with epilepsy, 1; exhaustion of chronic mania, 1; exhaustion of acute mania, 1."

The average duration of the mental disorder, in those who died, was 4.7 years. The average duration of the disorder, in the 43 cases admitted, was 1.85 years, which is 3.85 years less than the similar average in the cases received during the preceding year. Thus there is, in the language of Dr. Nichols, "a gradual movement towards a larger proportion of more recent, hopeful, and interesting cases than those with which the house was filled when it was opened, in January, 1855." As one patient was admitted twice in the course of the year, the whole number of *persons* who were patients was 152. Of these, 27 were from the army, 13 from the navy, 2 (pensioners) from the "Soldiers' Home," and 110 from civil life. Sixty-nine were of foreign birth.

The entire design of the principal edifice of this hospital embraces a central building and two wings, each of which is divided into six sections. Five sections of the westerly wing are completed and occupied. The sixth section of the same wing, the central building, and two sections of the easterly wing are in progress, and will probably be finished in the summer of 1859. At the date of this report (Oct. 1, 1858), no appropriation had been made for the construction of the remainder of the edifice. Since the issue of the last preceding report, Dr. William P. Young, the assistant physician, has resigned the office, and Dr. S. Preston Jones, formerly assistant physician at the State Lunatic Hospital at Harrisburg, Pennsylvania, has been elected as his successor.

11. On the 1st of November, 1857, Dr. Fisher, of the *Insane Asylum of North Carolina*, made a very brief report, chiefly devoted to the financial and architectural interests of that new institution.

	Men.	Women.	Total.
Patients in the asylum, Nov. 1st, 1856			80
Admitted in course of the year			89
Whole number			169
Discharged, including deaths	33	5	38
Remaining, Nov. 1, 1857	80	58	138[1]
Of those discharged, there were cured			13
Died			7

The subjoined numbers are from the report for 1858.

Patients, Nov. 1st, 1857	80	58	138
Admitted in course of the year	41	16	57
Whole number	121	74	195
Discharged, including deaths			49
Remaining, Nov. 1st, 1858			146[2]
Of those discharged, there were cured	14	10	24
Died			9

"With the exception of a mild endemic form of dysentery, which prevailed during the months of May and June, the health of the inmates has been remarkably good."

During the year, the average number of male patients employed in various departments of labour was forty, "while as large a number of females have been engaged in sewing, knitting, &c." Among the means for improving or enlarging the system of moral treatment, which Dr. Fisher mentions as especially needed, are a library, a magic lantern, a bowling alley, and a workshop. One of the

[1] Correctly deduced from the foregoing figures, this should be 131.

[2] This number is derived from the preceding figures. Dr. Fisher makes no direct statement of the number of patients remaining in the house, but in his general table, the word "Remains," or its equivalent, stands against the names of only 139. Hence it appears that the error, or discrepancy, of 7, which in some way was introduced into the numerical report for 1857, is continued through that of 1858.

female patients was so impressed with the want of books that, after her discharge, she collected, by subscription, "a sum sufficient for the purchase of a library for the ward which she occupied while an inmate of the asylum." Eleven newspapers are received gratuitously. Religious services are performed on Sundays, in the chapel, the clergymen of the city of Raleigh officiating in rotation.

The apparatus for lighting the building with gas was finished in the early part of the year. During the same period many other improvements, "both within and without the main building, and materially affecting the comfort and well-being of the entire institution, have been completed."

12. It appears that the proposition, discussed for several years, of erecting a new edifice, at a distance more remote from the city than that which is now occupied for the *State Lunatic Asylum of South Carolina*, has been decided in the negative. At the date of the present report, an enlargement of the building was in progress. This addition will "embrace all the improvements which experience has suggested. * * * The completion of this building, and the enlargement of the grounds of the asylum, by inclosing the street which now separates the two portions of them, will add greatly to the comfort of the patients, and the efficiency of the institution. * * * Our classification will be as complete as in any other institution of a similar character."

Patients in the asylum, Nov. 5, 1856	187
Admitted in course of the fiscal year	69
Whole number	256
Discharged, including deaths	63
Remaining, Nov. 5, 1857	193
Cured	35
Died	21

Deaths from chronic diarrhœa, 5; general dropsy, 2; apoplexy, 2; consumption, 2; epilepsy, 2; exhaustion, 2; dropsy of the chest, 1; dysentery, 1; disease of the heart, 1; pneumonia, 1; general paralysis, 1; internal abscess, 1.

"The past year," observes Dr. Parker, "has been one of remarkable exemption from evils which are by no means uncommon among the insane; contentment seemed to pervade our household, and was a subject of remark by strangers who were permitted to pass through our wards. * * * * It is with peculiar pleasure I state the fact that, during the past year, we have seldom had to confine a patient to his or her room for more than a few hours, and but in two instances has mechanical restraint been used. On those occasions it was absolutely necessary to confine a sick patient to bed who was averse to lying down, and was suffering from the effects of too long standing on his feet."

A sewing society has been formed in the female department, and "the regular sale of their handiwork has enabled them to put the chapel in complete order, and to have left in their treasury an increasing fund, to be hereafter disposed of according to their wishes. Besides the fancy work, one thousand nine hundred and ninety-five garments, household linen, &c., have been made for the use of the patients. * * * Morning and evening walks, the flower-garden, green-house, exhibitions with the magic lantern, music, bagatelle table, and other pleasant games are brought into use, all exerting a healthful and beneficial influence. * * * * I regret that with the male members of our family circumstances are not so favourable. The farm, garden, and general work about the house, afford employment to about twenty-five. Many others will be engaged at the mechanic arts as soon as arrangements can be made for their accommodation. The benefit which occupation, especially such as is accompanied with manual labour, affords in restoring the mind to cheerfulness and health, is incomparably superior to any other means resorted to for the benefit of the insane. * * * Religious service is another important means in the moral treatment of the insane. My observation enables me to testify to its soothing and cheering influence upon a large proportion of our patients. * * * These services have been judiciously and regularly dispensed during the year."

13. Dr. William S. Langley, formerly superintendent of the *Mississippi State Lunatic Asylum*, resigned his office in 1857, and was succeeded by Dr. William B. Williamson, "a gentleman," say the trustees of the institution, "of high professional repute, and in all respects worthy of public confidence."

	Men.	Women.	Total.
Patients admitted from the opening of the asylum, Jan. 8, 1855, to November 1, 1857 . . .	93	57	150
Discharged, including deaths	46	21	67
Remaining, Nov. 2d, 1857	48	35	83
Of those discharged, there were cured . . .	21	5	26
Died	8	9	17

In allusion to the statistics, Dr. Williamson says: "It may be supposed that the recoveries are small, and the number of deaths large in proportion to the cases treated, as compared with other and older institutions; but this may be accounted for from the fact that many of the cases were of long standing, and were exhausted by chronic mania before they were admitted. Of the recent cases, fully eighty per cent. have recovered. During the spring and summer of this year (1857) there were some cases of erysipelas in the house, but the disease did not extend to a great number of patients. There have occasionally been cases of diarrhœa, and also of dysentery, and recently one pretty severe case of pneumonia, which is now recovering. Some few of the inmates have also been attacked with influenza, which has prevailed so extensively over the country during the last few months. The cases were, however, mild and easily managed. At present we are pleased to say that the bodily health of the household is good."

"Regular employment, both bodily and mental, is a highly important remedial agent for the restoration of the insane. * * * Many of the male patients have already done a considerable amount of labour in clearing off the undergrowth within the outward inclosure, and in moving away the rubbish, and grading about the buildings; while the females have been employed in making up clothing, and various articles necessary to be used in the dormitories." The collection of a library is recommended. "The buildings which were required to supply the place of those destroyed by fire, in the spring of 1856, are not yet finished," but are in rapid progress.

14. In April, 1857, Dr. J. D. Barkdull was elected by the Board of Administrators of the *Insane Asylum of Louisiana*, as the physician and superintendent of that institution. His report, bearing date January 1, 1858, is comparatively brief, including but few topics of interest to the general medical reader.

	Men.	Women.	Total.
Patients in the asylum, Dec. 31, 1856 . . .	49	53	102
Admitted in course of the year	51	28	79
Readmitted	2	2	4
Whole number	102	83	185
Discharged, including deaths	31	29	60
Remaining, Dec. 31, 1857	71	54	125
Of those discharged, there were cured . . .	11	16	27
Died	19	10	29

Causes of death.—Chronic diarrhœa, 13; chronic gastritis, 2; general debility, 2; typhoid fever, 2; marasmus, 2; paralysis, 2; consumption, 1; disease of heart, 1; apoplexy, 1; hepatization of lungs, 1; ascites, 1; abscess of liver, 1.

"It will be seen," says Dr. Barkdull, "that the year just closed has been one of unusual prosperity, and especially in the sanitary condition of this institution; having had no disease during the past season assuming anything bordering on an epidemic form. This, in a great degree, is attributable to the important improvements made in the guttering and sewerage connected with the detached buildings, where usually the larger proportion of deaths occur, and where the more filthy class of patients are kept.

"Taking into consideration the unfavourable condition, mentally and physically, in which a large proportion of our patients are received, it is rather surprising than otherwise that so large a percentage should be discharged entirely restored in body and mind, after a stay varying from three to twelve months. * * * Fully one-half of the patients now in the institution are confirmed cases of dementia, the most of whom have been in this condition varying from three to ten years."

Dr. Barkdull urges the importance of extending the central building ninety or one hundred feet in the rear, in order to complete the original design, and to supply apartments, the want of which occasions much inconvenience.

Report for 1858.

	Men.	Women.	Total.
Patients in the asylum, Dec. 31, 1857 . . .	71	54	125
Admitted in the course of the year . . .	56	28	84
Whole number	127	82	209
Discharged, including deaths	47	25	72
Remaining, Dec. 31, 1858	80	57	137
Of those discharged, there were cured . . .	22	10	32
Died	17	10	27

Causes of death.—Chronic diarrhœa, 15; apoplexy, 2; dysentery, 2; general debility, 2; disease of the heart, 1; epilepsy, 1; phthisis, 1; paralysis, 1; suicide, 1; marasmus, 1.

The fatality "from chronic diarrhœa greatly predominated during the last past, as in all previous years; this being owing, in a great measure, to the prostrated condition of many at the time of admission, from the effects of protracted illness."

The patients assemble in the chapel, for religious worship, on Sunday evenings. Thirteen newspapers are received, gratuitously, from their proprietors. In the course of the year 2400 garments, and articles of bed furniture, were made by the patients, with the assistance of one hired seamstress.

	Men.	Women.	Total.
Patients admitted since the asylum was opened .	456	298	754
Discharged, recovered	109	82	191
Died	203	134	337

The subject of marriages of consanguinity in their effects upon offspring is briefly discussed in this report, but nothing is adduced which would add to, or modify, the results obtained by Dr. Bemiss, as exhibited in his excellent article published in the last volume of the *Transactions of the American Medical Association.*

In reference to the injurious effects of deception in the removal of insane persons to an asylum, the following case is related: "She was told to arrange for an extensive northern tour, and, as might naturally be expected under the circumstances, heard of the proposed journey with pleasurable emotions. In due time they were gliding up the river, with nothing to mar the delightful anticipations of the prospective. But here she was informed of a friend some few miles in the interior, who must not be passed. A proposal was made, and consent obtained. But mark the sequel: the boat landed; a hack was ordered, and in a few hours they arrived at the door of the asylum. 'What does this mean,' (said she.) 'Where have you carried me? Why! look around at these crazy people; surely this is an insane asylum. Is it possible I have been so deceived, and decoyed here by the basest falsehood and treachery? Yes, it is so; and that by those whom I was led to regard as my truest and most reliable friends. Well, I will never submit to such an outrage; you can force me in, but you will have to keep me by the same means. Take me where you promised on leaving home, and I will be content, but not otherwise; no, never.' Such is almost a literal description of a scene witnessed during the past year; and, although months have since fled, still scarcely a day passes without hearing something respecting the wrongs inflicted by this 'dishonourable transaction.'"

15. An act authorizing the construction of a *State Lunatic Hospital* in Texas has passed the legislature and become a law. A farm at Austin, the capital of the State, has been purchased, and a portion of it "inclosed with a substantial cedar fence;" and some further preparations have been made for the erection of the buildings. Dr. J. C. Perry has been appointed as the superintendent of the institution, and has travelled through the middle and some of the northern States of the Union, visiting several of the best of the American establishments for the custody and treatment of the insane, and making himself familiar with the most recent improvements in the architectural arrangements of their edifices. His "first semi-annual report," which is now before us, was rendered on the 27th of November, 1857. Its contents, so far as the hospital is concerned, relate chiefly to preliminary preparations, and hence furnish but little matter of general importance. The ground-plan adopted for the building is similar to that of the New Jersey State Lunatic Hospital, and of the Government Hospital for the Insane—the irregular, or broken, linear plan. As a preventive of destruction by fire, "all connection between the different subdivisions of the building, except through the corridors, is to be cut off by thick walls, extending through and above the roof, and provision being made for closing the openings at the corridors by means of sliding iron doors. The stairs, also, are to be of iron, set into the walls. Thus the danger of loss of life by fire will be diminished, and its extension from one part of the edifice to any other rendered improbable."

That portion of the report which presents the statistics of the insane and idiots of Texas, although those statistics are far from perfect, will be more widely read with interest.

The national census of 1850 returned 212,592 inhabitants of Texas, and an aggregate number of 141 idiots and insane persons. "These tables, however, are universally acknowledged to be unreliable." Hence an attempt has been made to ascertain the number of these two classes, by circulars addressed "to all the county officers, and to many physicians"—the same method which was adopted and executed with signal success, in Massachusetts. Returns, though incomplete in some cases, have been received from seventy-nine counties, while forty-seven counties, and all the large towns remain to be heard from. Imperfect as are these returns, "the pictures of suffering and destitution presented are lamentable in the extreme. Could we have a full account, it would be startling."

The data thus gathered afford the subjoined general numbers.

1st. Idiots. White males, 46; white females, 32; coloured males, 10; coloured females, *none*. Total, 88.

2d. Insane. White males, 91; white females, 46; coloured males, 4; coloured females, 4. Total, 144.

Aggregate of the two classes, 232. "From analogies, and from data received, to estimate the insane in this State at 350, and the idiots at 150, and the increase of the two classes at 70, annually, would probably be underrating their numbers."

The government authorities of Texas have acted wisely in the appointment of a superintendent of the hospital at the moment of its practical inception. No other measure could so largely contribute to the perfection of the future establishment. No other men have so fully studied, and none other so entirely understand all the details of architectural construction, of fixtures, appliances, and furniture, necessary to a good building for the insane, as the superintendents of those institutions which are already in operation.

16. The following extract is taken from the fifth annual report of the trustees of the *State Insane Asylum of California*. "From the date of our appointment by the legislature, up to the month of July, a question regarding the legality of the appointment of the resident and visiting physicians was pending in the courts, upon the decision of which depended the validity of our appointment. That question having been decided by the Supreme Court, our predecessors, on the first day of August, yielded up their trust, and the present board entered upon the discharge of their duties."

From this it appears; first, that the California Asylum has been subjected to one of those controversies which, whatsoever may be the result, in respect to the parties concerned, are always more or less prolific of evil, and of evil alone, to the institution itself, during their pendency and progress; and, secondly, that in the medical direction of the asylum the old, and almost entirely obsolete organization which includes the two offices of Resident Physician and Visiting Physician, has been revived.

Among the unfortunate effects of this controversy, one, which is important in a historical and a professional point of view, is mentioned by Dr. W. D. Aylett, the present resident physician, at the commencement of his report. "I entered," says he, "upon the discharge of my official duties, upon the first day of August, 1857. *My report will be confined to the period that has intervened. For the prior portion of the year, the record left me by my predecessor is too meagre to constitute the basis of a report.*"

	Men.	Women.	Total.
Patients in the asylum, August 1, 1857 . .	132	30	162
Admitted in five months	70	16	86
Whole number	202	46	248
Discharged, including deaths	46	14	60
Remaining, Dec. 31, 1857.	156	32	188

By an inspection of the general registration table, it appears that the data for its formation were so essentially "meagre," that of the 162 patients at the asylum when Dr. Aylett entered upon the performance of his duties, even the dates of admission of no less that 75 are recorded "unknown." From the same table, we learn that from the 1st of August to the 31st of December, 16 patients were discharged cured, and that of the 17 deaths in the same time, the causes of 16 were as follows: marasmus, 4; acute mania, 3; consumption, 2; dysentery, 2; epilepsy, 1; paralysis, 1; apoplexy, 1; chronic diarrhœa, 1; diarrhœa, 1.

Nearly all of this report is devoted to an exposition of the imperfections of the asylum buildings; and money is asked for the construction of "mad-houses for male and female patients, dining-room for female patients, chapel, bathing-rooms, privies," and other improvements. It is to be hoped that if these "mad-houses" should be erected, they will be designated by some less offensive name. And while we trust that the asylum, in all its *materiel*, will soon be placed, as it is implied from the language of Dr. Aylett that it is not now, "upon a respectable footing," we also look forward to the future issue of annual reports fraught, as were Dr. Reid's, in the earliest years of the institution, with matter of the deepest interest to the physician and the psychologist. P. E.

Art. XVIII.—*Medico-Chirurgical Transactions.* Published by the Royal Medical and Chirurgical Society of London. Volume the forty-first. London, 1858. 8vo. pp. 468.

This volume of *Transactions* contains twenty-one original communications. Thirteen of these communications, or abstracts of them, were published in the numbers of this journal for last year, in the quarterly summaries of improvements and discoveries in the medical sciences.

I. The first paper is, *An account of a Case of Arterio-Venous Aneurism of the Temporal Vessels, which was treated by Ligature of both the Artery and the Vein.* By Charles H. Moore, Surgeon to the Middlesex Hospital.

A history of this particular case is given in the number of this journal for January, 1858. We learn, in addition, from this communication, that the man was at work as an agriculturist, and perfectly well in the month of November

following the operation. The general conclusions at which the author has arrived, in a survey of the results of the various combinations of treatment practised in arterio-venous aneurisms, are as follows:—

"When the artery is tied above and below the opening the disease is cured; unless, indeed, an anastomosing branch join the artery between the ligatures, in which case arterial blood still continues to pass into the vein, and the operation is unsuccessful.

"The entire obliteration of the vein at the seat of the opening suffices equally with the closure of the whole artery for the cure of the disease. M. Nélaton undertook the treatment of a case of arterio-venous aneurism at the bend of the elbow by direct compression upon the wounded vessels, aided by pressure upon the artery at the higher part of the arm. After several months of treatment he succeeded in curing the disease, and at a post-mortem examination of the patient, two years afterwards, the vein was found obliterated at the site of the aneurism, the artery was healed and pervious.

"The only remaining mode of successful treatment, but a mode which could hardly be recommended for varicose aneurisms of the limbs, is that of obliterating both the arterial and venous trunks on the cardiac side of the communication between them" (the mode practised in the present case).

These general conclusions in regard to the successful modes of treating arterio-venous aneurism are very vague and unsatisfactory. The treatment proper for a case in which there is an intermediary sac between the artery and the vein would not be suited to another in which the communication between the vessels is direct; it must vary, also, with the size and situation of the vessels. The treatment practised in this particular instance, on account of the danger of applying ligatures to the veins, should never be advised; and it is evident that it was practised in this instance unwittingly, the temporal vein being tied under the belief that it was the artery.

It is fortunately only in very exceptional cases of arterio-venous aneurism that it is necessary to have recourse to an operation. Aneurisms increase in size because the pressure of the blood they receive is greater than the resistance of their walls; when there is a communication with a vein, a part of the blood finds thus an easy issue, and consequently, the pressure and the tendency to increase in size are much less in arterio-venous than in ordinary aneurisms. In those rare cases in which they grow rapidly and burst, or threaten to do so, the best mode of treatment, undoubtedly, is to ligate the artery above and below the sac. The opening into the vein allows the blood contained in the sac to escape, and the danger of consecutive hemorrhage from inflammation of the sac, caused by the presence of clots, does not exist as in ordinary aneurism, or, at least, is much diminished. By this proceeding the disease will always be cured, unless, as Mr. Moore says, there be an anastomosing branch between the ligatures. There is, we believe, only one case on record where this existed, and this which occurred in the practice of Dr. Norris was published in this journal for January, 1843.

The treatment of arterio-venous aneurism by direct compression has been more often, and more successfully practised than one would suppose from the statements of Mr. Moore. Besides the case to which he refers, M. Nélaton alone has thus successfully treated three others, and, as we learn from Broca (*Des Anévrysmes, et de leur traitement*, p. 290, Paris, 1856, 8vo.), direct compression had already, at the time of Scarpa, afforded several well-determined cases of success, and in the hands of Monteggia and the two Brambilla it succeeded completely. Arterio-venous aneurisms are far more often seen at the bend of the elbow than in any other situation, and we have here all the conditions most favourable for the employment of direct compression, and for continuing it as long as may be desired. The artery is but of medium size, it is near an osseous surface upon which it is easy to compress it, and the aneurism is superficial and generally not large. In those parts of the body where direct compression cannot be used, in case it be absolutely necessary to interfere, the double ligature of the artery or injections of perchloride of iron thrown into the sac, would be preferable, certainly, to ligation of the artery and vein on the cardiac side, as practised by Mr. Moore.

II. *Case of Communication with the Stomach through the Abdominal Parietes produced by Ulceration from External Pressure, with Observations on the Cases of Gastro-Cutaneous Fistula already recorded.* By CHARLES MURCHISON, M.D., Edin., etc.

An abstract of this paper, the most important that has yet been written on the subject of gastro-cutaneous fistula, was given in this journal for July, 1858. Certainly very few persons, even among those best acquainted with the literature of the profession, were aware that so many as twenty-five cases had been recorded of this affection. Complete as the paper is, it is somewhat remarkable that no reference is made therein to those cases in which it has been sought by surgical interference to establish these fistulæ, for the purpose of thus introducing nourishment into the stomach when the natural passages are closed.

A note appended to the history of this case states that the patient was then in better health than she had been the year before, when her history was taken, and, moreover, that the dimensions of the opening in the abdominal parietes had slightly increased. It is to be hoped that a case so calculated to aid in the solution of several undecided questions in regard to the action of the secretions of the stomach upon the food may not be neglected, and thus benefit to science may accrue from the infatuated act of this foolish creature.

III. and IV. Therapeutic Communications, Nos. I. and II. *On the Influence of Liquor Potassæ and other Caustic Alkaline Solutions upon the Therapeutic Properties of Henbane, Belladonna, and Stramonium.* By ALFRED B. GARROD, M.D., &c.

These are the first of a series of results obtained during a course of clinical investigations on the action of drugs, which Dr. Garrod announces his intention of laying before the society from time to time. The subject is certainly one of high importance, and it is one, moreover, which he is peculiarly capable of investigating, being both professor of materia medica in University College, and physician to University College Hospital. Full abstracts of these first two communications were published in the numbers of this journal for April and October of the past year. To the first of these were appended the results of some experiments of Mr. John F. France, related in the *Lancet*, which were entirely at variance with those of Dr. Garrod. In a note at the beginning of his second communication, Dr. Garrod shows how Mr. France had fallen into error; in one of his experiments, for example, the amount of potash employed was not more than half sufficient to neutralize the natural acidity of the extract. The clinical observations and the experiments of Dr. Garrod prove, beyond a doubt, that the caustic fixed alkalies possess the peculiar power of destroying the active principles of henbane, stramonium, and belladonna, even when in dilute solution, and that such combinations are, therefore, both chemically and therapeutically incompatible, and should never be prescribed.

V. *A Contribution to the Science of Teratology.* By HENRY R. SILVESTER, B.A., M.D., Lond. (Communicated by Dr. Silvester.)

This paper contains an account of a remarkable instance of congenital malformation of the two upper extremities. The external appearances of the malformed parts were as follows:—

"*The Right Arm.*—The shoulder and upper arm deviated but little from the regular form. The forearm appeared shorter than usual. This was occasioned by the situation of the hand, which was fixed in a prone position, and flexed to such an extent that the radial side of the index finger lay adjacent to the radial side of the forearm. The forearm itself was directed a little outward, so as to form an angle with the outer side of the upper arm. The hand presented four fingers, without the slightest indication of a thumb.

"The *left arm* was more deformed. The shoulder was flattened, and the limb tapered gently to the wrist, and hung down by the side of the chest, with the hand directed backwards and upwards, and fixed in such a position that the palm of the hand faced the back of the forearm. The upper arm seemed to be nearly absent, and the prominence of the elbow was felt close to the posterior fold of the axilla. The hand presented only two fingers, the ring and the little finger."

The descriptive anatomy of the malformed limbs is given very minutely; the account occupying twenty-three pages. In addition to this, three tables are added of the muscles, the arteries, and the nerves, as they were present, or absent, or found in an abnormal state. This paper will be an exceedingly useful one, therefore, for future reference, as cases of similar deformity are constantly presenting themselves. The author has purposely avoided entering upon the general subject of monstrosities, and has kept closely to the facts and inferences suggested by the particular instance before him. Among his conclusions we notice the following as bearing most upon the disputed points in teratology:—

The absence of the usual bony attachment, or the want of a firm point of insertion, exerts a material influence upon the development of a muscle.

The absence or defective state of an organ reacts unfavourably upon the formation of the nerves and vessels which supply it, even at a distance.

Another point worthy of notice is that the deformity in the right arm does not conform to the rule laid down by Rokitansky, that when the radius is wanting, the thumb and forefinger, with so much of the carpus as belongs to them, are wanting too.

According to the classification of Saint Hilaire, the one generally adopted, this monster belongs to the family of *Ectromelians* (to make abort—a limb); a family which he declares to be the most difficult of all to classify and to divide into well-defined genera. This monster should probably be placed in the genus *Hemimele.*

This communication is accompanied by two wood-cuts, containing numerous figures, illustrating very fully the descriptions given in the text.

VI. *On some points in the Pathology and Morbid Anatomy of Glaucoma.* By J. W. HULKE.

A full abstract of this paper, and also of the remarks its reading called forth from Messrs. Bowman, Critchett, and Haynes Walton, was published in the April number of this journal for the past year. The symptoms of glaucoma have been generally attributed, of late years, to an effusion between the choroid and the retina, the result of acute or chronic choroiditis. It would seem, however, that no morbid changes are found in the choroid except fulness of its vessels, and that the hemorrhage comes from the capillaries in the inner layers of the retina.

The hemorrhagic spots in the retina and the irregular dilatations of the retinal capillaries are represented by two wood-cuts.

VII. *On the Analysis and Immediate Principles of Human Excrements in the Diseased State.* By W. MARCET, M.D., F.R.S., &c.

In the examination of human excrements, Dr. Marcet divides them mechanically into their immediate principles instead of chemically decomposing them. Some of the results he has thus obtained from fecal evacuations in a healthy state were given in a paper communicated by him to the Royal Society, published in this journal for January, 1858. We see from this present communication that he has simplified and added to his former mode of analysis, and the one he now offers to the profession he declares to be calculated to yield results at least as important as those already derived from the analysis of urine.

After having observed their physical characters, such as colour, consistency, odour, and reaction, the evacuations are microscopically examined, and then, if fluid or semifluid, they are concentrated in a water bath until reduced to the degree of solidity of healthy feces; the successive stages of the analysis of the resulting mass will be readily understood by a glance at the following synoptic table:—

- Excrements exhausted with boiling alcohol, and strained through a double fold of fine muslin
  - An insoluble residue left on the cloth.
  - A solution yielding on cooling
    - A deposit which, exhausted with alcohol, yields
      - An insoluble residue — This residue is to be dissolved in potash, and the solution decomposed with hydrochloric acid. Examine the solution for the detection of phosphoric acid, lime, and magnesia, and the precipitate for the detection of fatty acids.
      - A solution
        - A crystalline deposit on standing (*fatty acids and soaps*).
        - A residue, when evaporated to dryness, which, treated with ether, yields
          - An ethereal solution (*fatty acids*).
          - A residue insoluble in ether (*soaps*).
    - A solution which is mixed with milk of lime. The lime precipitate, treated with ether, yields
      - An ethereal solution (*excretine, colouring matter*).
      - An insoluble residue which, decomposed with hydrochloric acid, yields
        - A solution of chloride of calcium.
        - A solid substance, soluble in ether (*fatty acids*).
      - A solution. It is to be evaporated to dryness, decomposed with sulphuric acid, exhausted with a mixture of alcohol and ether, and this solution tested for *organic acids*.

Dr. Marcet gives the history of three different pathological cases to show the results obtained by this method of examining the feces. In the first the excrement yielded a large amount of free fatty acid, which does not exist in healthy human feces unless a very large amount of vegetable food has been taken. The post-mortem examination was made in this case, and it showed the state of the liver and the pancreas to have been such that both bile and pancreatic juice must have been deficient in the intestines. In the two other cases there was an evident deficiency of bile in the stools, and in these cases also they contained a considerable proportion of free fatty acids. In a note, it is stated in addition, that, since writing this paper, the author has examined the motions passed in another case of jaundice and found them to contain a large proportion of fatty acid.

In connection with this subject of the action of the different secretions poured into the intestinal canal, in the matter of fatty stools, we find that in the elaborate memoir of Dr. Da Costa, on the *Morbid Anatomy and Symptoms of Cancer of the Pancreas*, recently published in the proceedings of the Pathological Society of Philadelphia, it is stated that pathological anatomy seems to contradict the assertion that the pancreatic secretion possesses alone the power to emulsify, and to render the fatty matters fit for absorption; that it can certainly not be the only agent; when fat is not acted upon, the duodenal secretions must also be vitiated, and the flow of healthy bile interfered with.

The last number of Brown-Séquard's *Journal of Physiology* (for October, 1858), contains the translation of a recent paper by Dr. Marcet on the part performed by the stomach and by the bile in the digestion of fats. In it the author declares that in five cases in which the bile could not flow into the intestine, he found the fecal matters to contain free fatty acid. As the phosphate of soda is one of the constituents of bile he first made some experiments with it, and found it to emulsify perfectly fatty acids; with the neutral fats this did not occur. With bile itself the same phenomena took place. As the fats in food are neutral, it might be concluded, *à priori*, that the bile cannot serve in their digestion, but other experiments are given which show that in the stomach the fatty matters in the food are, in the stomach, changed into fatty acids.

In a note added to the paper of Dr. Marcet, Brown-Séquard records the following experiment to show that the absorption of fat can take place without any influence having been exerted upon it by the pancreatic juice, the bile, or the intestinal secretions (those of the small intestines): After having tied the large intestine immediately above the ileo-cæcal valve, in a cat, the large intestine was emptied by injections, and then 100 grammes of fresh lard at the temperature of 104° were thrown in and the rectum tied; five hours afterwards the animal was killed, and only 86 grammes of a fatty liquid were found in the large intestine.

VIII. *On the Membrana Decidua which surrounds the Ovum in Cases of Tubal Gestation.* By Robert Lee, M. D., F. R. S., &c.

A full abstract of this paper is given in the April number of this journal for the past year.

IX. *Supplement to a Paper on the Membrana Decidua which surrounds the Ovum in cases of Tubal Gestation.* By ROBERT LEE, M. D., F. R. S.

This paper contains the history of another case of extra-uterine gestation, and of the post-mortem examination, communicated to Mr. Lee by Mr. Favell, with the minute dissection of the preparation consisting of the right half of the uterus, right Fallopian tube, and ovary, made by Mr. Lee himself. He found no difficulty in satisfying himself in this instance as in the others recorded in the preceding paper, that the placenta and villi of the chorion were everywhere completely invested with a deciduous membrane. From the remarks of Mr. John Clarke, appended to the abstract of the paper given in the journal, it appears that he is not inclined to adopt the opinion of Mr. Lee, that in Fallopian tube gestation a deciduous membrane is always formed round the ovum; he could find no appearance, in the preparation presented, of a strictly speaking deciduous membrane; there was, according to him, nothing but the fœtus, the amnion, and the chorion, lying against the inner coat of the tube.

Mr. Lee's paper is, it must be said, altogether unsatisfactory so far as the proof of the existence of a membrana decidua in tubal gestation is concerned. He finds enveloping the fœtus, under these circumstances, one membrane he calls the amnion, another he calls the chorion, and over this another which he chooses to call membrana decidua, but whose anatomical composition he does not describe. What is called membrana decidua in the uterus is well known at the present day to be merely a modification of the mucous membrane lining the uterus, which is very different from that lining the Fallopian tubes, the one being very thick and filled with follicles, while that of the tubes has no follicles and is very thin. It seems hardly probable that the mucous membrane of the tubes could undergo the very peculiar changes undergone by the mucous membrane of the uterus, a very different structure, and the membrana decidua outside of the uterus must be a very different thing from one inside. To call, therefore, *membrana decidua*, a membrane made out by the scalpel to cover the chorion, is not to convey any definite idea of what the membrane really is, even allowing it to be capable of demonstration, which Mr. Clarke positively denies.

X. *On the Action of Galvanism upon the Contractile Structure of the Gravid Uterus, and its Remedial Powers in Obstetric Practice.* By F. W. MACKENZIE, M. D., Lond., &c.

An abstract of this very interesting paper is contained in the number of this journal for July, 1858. The mode in which the current is made to pass is not, however, stated therein with sufficient exactness; the positive pole should be applied to the nape of the neck, and the negative, by means of a vaginal conductor, to the cervix uteri.

XI. *A Case of Complete Inversion of the Uterus of nearly Twelve Years' Duration successfully treated.* By W. TYLER SMITH, M. D.

An abstract of this paper, with the discussion that took place when it was read before the society, is given in this journal for July, 1858. We learn from a postscript to the paper that the patient has since been delivered of a living child; some amount of flooding occurred after labour, but no tendency to inversion was manifested.

XII. *On Excision of the Knee.* By GEORGE MURRAY HUMPHRY.

An abstract of this paper was published in this journal for July, 1858, together with the remarks its reading called forth, in the society, from some of the most eminent surgeons of England. It is very satisfactory to find that the opinions of the author were, by them, very generally condemned, and it is to be desired that this condemnation may become universal.

XIII. *Contributions to the Etiology of Continued Fever: or an Investigation of Various Causes which Influence the Prevalence and Mortality of its Different Forms.* By CHARLES MURCHISON, M. D., Edin., &c.

This paper is much the longest of any in the volume, occupying eighty-eight pages. The conclusions to which the author has arrived as the result of his extensive and well-directed investigations are given in the July number of this journal for 1858. Another conclusion, which he has since been led to adopt

from the further study of the conditions under which epidemics of relapsing fever have appeared, is that this fever is the result of famine alone, and that the poison of typhus is generated by destitution and overcrowding combined.

This essay is an exceedingly valuable contribution to the subject of hygiene, and also to medical pathology. In it are investigated not only the causes which influence the prevalence and mortality of continued fever regarded as a single disease, but also, in showing that different causes produce different forms of fever, much light is thrown upon the specific identity or non-identity of these different forms.

XIV. *Case of Hydatids of the Tibia.* By WILLIAM COULSON.

A short abstract of this case will be interesting, from the extreme rarity of the affection to which it refers.

The patient, a married woman, 25 years of age, had received eight years before on the front of the right tibia, a little below the insertion of the ligamentum patellæ, a kick, which was soon followed by a swelling that gradually and steadily increased. At the expiration of four years the pain became very severe, and some blisters were applied, after which the pain was less. Ten weeks before presenting herself to Mr. Coulson the swelling gave way spontaneously, and matter containing acephalocysts was discharged. When he first saw the patient the swelling, situated just below the tuberosity of the right tibia, was as large as an orange; in its centre was a small ulcer, and the surrounding integuments were red and swollen. The discharge, which was not considerable, was found to contain some acephalocysts, and thus the nature of the affection was revealed.

The operation performed for the relief of this case was opening the cavity and destruction of its lining membrane with solid nitrate of silver; a few weeks afterwards a small piece of necrosed bone was removed from the upper part of the floor of the cavity, and it then gradually filled up. In the examination made of the cyst and of its contents, it is stated that no trace of echinococci could be found.

This affection, hydatid tumour in the osseous system, is one, as said before, of extreme rarity; in fact, with the exception of the one whose history has just been given, we believe that but fifteen cases have ever been recorded. In these, the tibia was affected six times; the frontal bone, three; the humerus, twice; the pelvic bones, twice; the femur, once, and the vertebral column, once.

XV. *A Case of Fibrous Polypus of the Urinary Bladder, with Observations, and a Table of the Recorded Cases.* By JOHN BIRKETT.

This case of *fibrous polypus*, as it is called by Mr. Birkett, occurred in a young girl, five years of age, whose condition was most cachectic and miserable. The new growth which was soft, but strong enough to resist ordinary manipulation, projected through the meatus urinarius, and, the index finger being passed into the bladder, was found to be attached to the superior region of the neck of the bladder. The child was unable to pass urine voluntarily, and what was removed by the catheter was turbid, dark-coloured, ammoniacal, and deposited a muco-purulent precipitate. A portion of the tumour was removed by ligature; a few days afterwards considerable pyrexia supervened, and the child died. At the autopsy a number of new growths were found in the bladder, having more or less of the polypoid form; that is, their points of attachment were much narrower than their free extremities, although, with the exception of one or two, they could scarcely be called pedunculated. They had their seat in the mucous membrane and submucous connective tissue, the former extending over their surfaces. When microscopically examined, these growths showed none of the fibrous vascular characters of uterine polypi; they were readily broken up into amorphous pieces, which consisted of cells and nuclei, having a glistening appearance, but at their edges the matrix could be seen, which was composed of a network of most delicate fibres, resembling somewhat elastic tissue.

The observations appended to the history of this case are chiefly in regard to the differential diagnosis of polypus of the bladder. The disease is said to be distinguished from other intra-vesical growths, in the dysuria preceding the bleeding, while in the latter blood mixed with the urine is generally the first indication which attracts the notice of the patient. After having ascertained,

then, that the dysuria is independent of prostatic or urethral disease, the distinguishing feature of the affection is what Mr. Birkett, correctly perhaps, though the expression sounds oddly, calls the *anæmic state* of the urine.

In the table of recorded cases but ten have been collected by Mr. Birkett. He would have found others in the monograph of Nicod *On Polypi of the Urethra and Bladder* (Paris, 1835); and since then M. Hélic has published a typical case, occurring in a man sixty-three years of age (*Bulletins de la Soc. Anat.*, 1838); and M. Mercier has also given another in his *Recherches Anatomiques* (1841).

It is rather remarkable that the case should be styled one of *fibrous* polypus, judging from the account given of its microscopical examination.

This communication is accompanied by a plate representing the interior of the bladder.

XVI. *Researches on Gout.* Part I. *The Urine in the Different Forms of Gout.* Part II. *The Influence of Colchicum upon the Urine.* By ALFRED B. GARROD, M. D., &c.

An abstract of this interesting communication was published in this journal for October, 1858. On account of the interest attached to the subject, we will give the conclusions at which he has arrived as to the influence of colchicum upon the urine, in full. They are as follows:—

"First. That there is no evidence that colchicum produces any of its effects upon the system by causing the kidneys to eliminate more uric acid; in fact, I believe that when continued for any length of time, the contrary rather holds good.

"Secondly. That from the observations in the present communication we cannot assert that colchicum has any influence upon the excretion of the urea or other solids of the urine.

"Thirdly. That colchicum is by no means a diuretic in all cases, but, on the contrary, it often diminishes the quantity of urine, especially when it produces a marked effect upon the secretions of the alimentary canal."

Dr. Hammond, in his experiments on the action of certain vegetable diuretics (in this journal for January, p. 277), found that colchicum was the only one in which there was an increase in the amount of solid matter eliminated. We repeat with him, therefore, "that it is desirable that we should have further observations with this article."

XVII. *Contributions to the Pathology of the Glandular Structures of the Stomach.* By WILSON FOX, M. D., of Newcastle-under-Lyme. Communicated by Dr. Garrod.

This paper of Dr. Fox is drawn up from the notes of observations made upon 100 stomachs, taken indiscriminately from the bodies of patients brought for post-mortem examination to the Pathological Institute attached to the Charity Hospital, in Berlin. It is valuable, rather as a contribution to the pathological anatomy of the glandular structures of the stomach than to their pathology, for there is seldom any connection made between the post-mortem appearances therein recorded and the symptoms exhibited by the patient during life.

This communication is accompanied by two plates containing a number of engravings.

XVIII. *On the Influence of the Cervical Portions of the Sympathetic Nerve and Spinal Cord upon the Eye and its Appendages, illustrated by Clinical Cases, with Observations.* By JOHN W. OGLE, M. D., &c.

An abstract of this paper, one of the longest, and, at the same time, most interesting, both physiologically and pathologically, in the whole volume, is published in this journal for October, 1858.

XIX. *An Account of a Case of Calculus in the Bladder removed by Lithotrity, in which a communication existed between the Bladder and Intestine.* By CHARLES HAWKINS, F. R. C. S., &c.

This case is a very remarkable one; a gentleman, 55 years of age, who had never experienced inconvenience of any kind about the pelvic organs, suddenly commenced to pass fecal matter with his urine; at the end of a year symptoms

of stone showed themselves, from which he suffered greatly for about eighteen months, when he was relieved by lithotrity, which was practised several times. The calculus was composed entirely of triple phosphates, having as a nucleus a small portion of vegetable matter. The patient continued to pass feces at times in his urine, but at the time of the writing of the communication was quite well, and free from pain; his water, generally, was quite clear and never contained any blood.

XX. *A Case of Dislocation of the Humerus Upwards and Inwards, with Fracture of the Coracoid Process of the Scapula, accompanied by a Dissection of the Parts Involved in the Injury.* By T. HOLMES.

The extraordinary dislocation of the humerus, described in this case, was the result of a fall from a great height, the patient, a man fifty years of age, striking the head, the left side of the chest, and the left elbow. The injury at the shoulder-joint was diagnosed immediately, and on the death of the patient from purulent infection, about a fortnight afterwards, the diagnosis was confirmed by dissection. The head of the humerus was found immediately under the skin, having passed through the fibres of the deltoid, and having the cephalic vein on its inner side. In its passage upwards it had fractured the coracoid process, and was resting behind on the stump of this process, and on the clavicle, with a small portion of the coraco-acromial ligaments, which remained untorn. The glenoid cavity was *below* and a little external to it, its tip lay on a horizontal plane quite below the level of the dislocated head of the bone. The long tendon of the biceps remained still attached to the scapula; in leaving the glenoid cavity, the humerus had slightly injured it, so that some of its internal fibres had been torn away from the muscle. The coracoid process had been fractured near its base. The muscles attached to the greater tuberosity of the humerus were torn through, except that a portion of the teres minor remained.

This is the only case recorded of this peculiar form of dislocation, in which the dissection of the parts after death is given.

XXI. *A Case of Premature Puberty.* By ROBERT BATH SMART, M. R. C. S.

This communication contains a very full account of premature puberty, occurring in the person of Mary Deane, of Manchester, in whom the catamenia made their first appearance when the child was three years and six months old.

W. F. A.

ART. XIX.—*On the Nature, Causes, Statistics, and Treatment of Erysipelas.* By PETER HINCKES BIRD, Fellow by Examination, and Licentiate in Midwifery, of the Royal College of Surgeons, etc., Fellow of the Royal Medico-Chirurgical Society, Author of the Jacksonian Prize Essay for 1849: On Erysipelas, etc. etc. "*Ars medica est tota in observationibus.*" 8vo. pp. 60. London, 1858.

THERE are few diseases the true pathological character of which has been more completely overlooked than has been that of erysipelas. Attention being solely directed to the diffuse inflammation of the skin by which it is ordinarily attended, this has been fixed upon as its invariable pathognomonic sign —one of its more common manifestations being thus mistaken for the entire disease. The close relationship which was found to exist between erysipelas and affections that, at one period, were supposed to be the most widely removed from it, gave rise to a renewed and more accurate investigation into the true character of the disease, the result of which has been to show that the characteristics of the same diffuse inflammation to which the distinctive term erysipelas has been applied, may be manifested in other tissues than the skin and subcutaneous cellular membrane.

With Dr. Bird, we must then view erysipelas as "a mode of inflammatory

action requiring a particular constitutional state for its development, and called into operation by various and opposite causes." Either by cold, by errors of diet, by injuries, or by contact with an individual labouring under the disease, by infection, and, perhaps, by other less obvious excitants.

The term erysipelas should be restricted to the diffuse inflammation of the skin and subcutaneous cellular tissue; which, however, is not to be classed as a distinct disease, but merely as an example, in the words of Dr. Bird, on the skin, of the same form of disease which may occur in other tissues—constituting diffuse inflammation of the mucous or serous membrane, diffuse phlebitis, puerperal fever, etc.—"all of which have a common origin, a poison in the blood, are infectious and contagious, and may mutually produce each other."

As alliances of erysipelas Dr. Bird includes those instances of diffuse inflammation of the various structures of the body originating in, or in connection with, this disease. These alliances he groups together as follows:—

"1. *Diffuse inflammation of the cellular tissue.*—There is much evidence in favour of the opinion of the close affinity between erysipelas and diffuse inflammation of the cellular tissue. The general and many of the local symptoms of diffuse inflammation of the cellular tissue closely resemble those of erysipelas. The commencement of the disease is marked by the same general derangement, and the constitutional symptoms are of the same character—the changes locally produced by erysipelas in its cellulo-cutaneous form and diffuse cellular inflammation are wonderfully alike: the predisposing causes are the same, the results identical if resolution does not take place. Diffuse cellular inflammation occurs, in connection with puerperal fever, a disease which, as will be afterwards shown, is closely allied to erysipelas. Diffuse cellular inflammation and erysipelas prevail epidemically at the same time. One form of the disease is extremely liable to produce the other in a second person; and the two forms of disease are mutually capable of exciting each other.

"Many circumstances connected with the coincident appearances and causes, the circumstances under which it is most rife, its mode of propagation, its accompanying local and constitutional phenomena, the prevalence of the two diseases at the same time, induce a strong suspicion of a close alliance between hospital gangrene, malignant pustule, and erysipelas.

"2. Numerous writers refer to the close affinity between erysipelas and *diffuse inflammation of the mucous membrane.* There is strong evidence in favour of the opinion that emanations from those affected with erysipelas will produce diffuse inflammation of those membranes; and I have met with several cases in which a direct extension of the diffuse inflammation had manifested itself from the fauces to the external skin by the anterior nares and lachrymal passages, and *vice versâ;* and the extension of the diffuse inflammation down the throat, has been observed to appear around the wound of tracheotomy in the form of erysipelas.

"A diffuse inflammatory state of the fauces has been mentioned as a precursor of erysipelas, and this is so frequently the case that it was observed in nearly sixty per cent. of the cases of idiopathic erysipelas of the face, of which I have taken notes; it was sometimes observed in idiopathic, and occasionally, but much more rarely, in traumatic erysipelas of the extremities. * * * Some interesting cases have been witnessed of erysipelas spreading down the throat, and also of extending up the vagina and rectum. * * *

"Diffuse inflammation of the mucous membrane is not unfrequent in those attending on cases of puerperal fever; the value of this fact will be appreciated when the alliance between erysipelas and puerperal fever is determined.

"There are occasionally observed in the surgical wards of hospitals, other cases which seem to point out clearly the alliances of erysipelas; thus supposing there are several cases of erysipelas of the head, face, or extremities; patients who have taken neither mercury nor iodine, become subject to acute stomatitis, others have swelling and tenderness of the tongue, accompanied with diffuse inflammation of the fauces, and considerable constitutional disturbance.

"From the occurrence of these cases of cynanche with ordinary erysipelas, from the fact that we can often trace the continuity of inflammation from the

fauces to the face, through one or several of the passages by which the mucous membrane is continuous with the skin, and *vice versâ;* from the connection of these with occasional glossitis and stomatitis; from the condition of the mucous membrane accompanying these affections, and from the general testimony in favour of its contagiousness, we can but conclude that these affections are instances of these structures being attacked by diffuse inflammation, which when limited to the skin is properly termed erysipelas.

"*Diffuse inflammations of serous membranes.*—Various writers have included these affections under the term 'erysipelas,' and the evidence to be produced will serve to prove the strong alliance existing between them.

"A. *Diffuse arachnitis.*—It is difficult to say how far diffuse arachnitis is allied to erysipelas; but it is pretty certain that in many cases of erysipelas of the head this alliance can be traced. Alibert evidently inclines to the opinion that the membranes of the brain may be affected by diffuse inflammation in connection with erysipelas. Nunneley believes that the frequent purulent deposits in various viscera will never or rarely be found to follow accidents to the head, unless preceded by diffuse arachnitis; but in patients who have died from erysipelas of the head I have by no means found this condition of frequent occurrence.

"B. *Diffuse inflammation of the peritoneum, pleuræ, pericardium,* &c., has been frequently noticed supervening upon erysipelas.

"C. *Puerperal fever.*—Writers even from an early period suggested, and the limited testimony of later authors confirm, the connection which exists between erysipelas and puerperal fever. * * *

"The following is striking evidence in favour of this opinion. The local symptoms during life and the appearances after death are identical, allowance being made for the different situation and texture of the parts attacked; both puerperal fever and erysipelas arise under the same circumstances, in crowded and close wards; both diseases are marked by great disposition to the formation of unhealthy pus; the same danger attends inoculation with the fluids effused in puerperal fever, and the immediate development of erysipelas or malignant pustule in the part inoculated; both erysipelas and puerperal fever may exist in the same patient; they prevail at the same time, and may during life mutually produce each other in a second person.

"D. *Diffuse inflammation of veins, arteries, and lymphatics. Diffuse phlebitis.*—So similar are the constitutional and even local symptoms of diffuse phlebitis and erysipelas, that even the best observers have made errors in diagnosis. In both these diseases there is the same disposition to the deposition of pus in different organs, and for inflammation and imperfect suppuration to be set up in distant parts of the body; there is the same tendency for the serous membranes to become affected; both diseases depend upon constitutional causes, more than upon the immediate exciting cause; one form of complaint is very liable to produce the other; and it has been observed that the same condition of atmosphere conduces to erysipelas and diffuse phlebitis. Abundant evidence has already been brought forward to substantiate the opinion, that puerperal fever prevails most when erysipelas and other diffuse inflammations are rife—produces them, and is produced by them; and as one form of puerperal fever consists in diffuse inflammation of the uterine veins, much of the evidence in proof of the close alliance between erysipelas and puerperal fever is applicable here.

"It is probable that like other serous membranes the internal structure of arteries may be subject to diffuse inflammation, in connection with erysipelas, but I have not met with any instances. Guthrie speaks of erysipelatous inflammation of arteries, and gives three instances.

"As the lymphatics, owing to their general and dense distribution within as well as between all the organs of the body, necessarily take part in every inflammation, they are no exception to the general rule. The two diseases are occasionally observed to be complicated to a remarkable extent; many patients affected with angeioleucitis being soon after attacked with cutaneous or cellulo-cutaneous erysipelas, and *vice versâ*, those who were first attacked with erysipelas soon presenting it complicated with angeioleucitis."

The rest of the work before us is devoted to the statistics and treatment of erysipelas, or diffuse inflammation of the surface.

Dr. Bird divides the disease into two species: 1. *Uncomplicated Erysipelas;* having three varieties: α. of the face and head; β. of the trunk; γ. of the extremities. 2. *Complicated Erysipelas;* having two varieties: α. with diffuse inflammation of the subcutaneous cellular and adipose tissues; β. with inflammation of fascia, intermuscular cellular tissue, and joints.

Under the head of "Statistics," Dr. B. presents the following analysis of 260 cases of erysipelas:—

	Men.	Women.	Total.
Idiopathic of head, face, etc. . . .	34	51	85
Traumatic of ditto	27	13	40
Idiopathic of extremities . . .	27	22	49
Traumatic of ditto	59	27	86
			260

	Rigors and constitutional symptoms were observed in—	Constitutional symptoms without rigors in—	Precursory sore throat in—	No precursory symptoms in—
Idiopathic of face	Men 23, or 67.6 per ct.	6, or 17.6 per ct.	14, or 41.2 per ct.	4, or 11.8 per ct.
	Women 38, or 74.5 "	7, or 13.7 "	31, or 60.7 "	3, or 5.8 "
Traumatic of face	Men 8, or 29.6 "	10, or 37.0 "	2, or 7.4 "	9, or 33.3 "
	Women 6, or 46.2 "	5, or 38.5 "	1, or 7.6 "	2, or 15.4 "
Idiopathic of extremities	Men 12, or 44.4 "	10, or 37.0 "	3, or 11.1 "	2, or 7.4 "
	Women 13, or 59.1 "	4, or 18.2 "	3, or 13.6 "	1, or 4.5 "
Traumatic of extremities	Men 25, or 42.4 "	15, or 25 4 "	2, or 3.4 "	17, or 28.8 "
	Women 11, or 40.7 "	10, or 37.0 "	....	6, or 22.2 "

In 81 cases of idiopathic erysipelas of the face, the different parts of the face were attacked in the following order of frequency:—

Right side of face.	In women	29	times, or 56.9 p. c.		Men	17	times, or 50.0 p. c.	
Left side of face.	"	10	"	19.6 "	"	10	"	29.4 "
Middle line of face.	"	7	"	13.7 "	"	4	"	11.8 "
Both sides at same time.	"	3	"	5.9 "	"	1	"	2.9 "

In these 260 cases, 20 deaths occurred, or 7.5 per cent. Of these, *one* case was complicated with severe burn; *one* with dropsy, after scarlet fever; *one* with advanced phlebitis; *one* with a severe scalp wound; *two* were dying when seized; *another* was dying from extreme neglect before admission.

The 260 cases occurred in the different seasons as follows: *Spring*, 66; *Summer*, 49; *Autumn*, 56; *Winter*, 89. That erysipelas is more frequent during winter and spring, in London, is shown by the following table, derived from the Registrar-General's returns.

	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	Total
Spring	95	71	116	196	137	119	81	120	86	96	1117
Summer . . .	80	78	107	129	114	103	74	98	74	115	972
Autumn . . .	56	92	126	128	99	65	76	54	80	109	875
Winter	77	106	176	126	109	87	116	67	84	128	1076

In 41 cases of erysipelas, no eruptive fever was present in 5 cases; its presence was uncertain in 2 cases. It did not exceed 12 hours' duration in 15 cases; 24 hours in 9 cases; 48 hours in 6 cases; 72 hours in 1 case. In 3 cases only was a precursory fever unquestionably observed; in one of which it lasted 4 days, in the other two 1 day.

In 173 cases collected from hospital practice, in 66 no mention is made of precursory fever; in 21 it was remarked as uncertain. In 34 it did not exceed

12 hours' duration; in 26, not 24 hours; in 20, not 48 hours; in 5, not 72 hours; and in *one*, it lasted 7 days.

In 82 cases, the time of day at which the symptoms first appeared was: during the day in 37—viz., 19 men and 18 women; after night in 45 cases—viz., 15 men and 30 women.

The temperature of the inflamed skin, in the case of a man with erysipelas of left hand, was 94°. In the case of a young woman with erysipelas of face, the temperature of recently inflamed skin, on first day, was 97.7°, while that of the cavity of mouth was 99.5°, and of the healthy part of face 95.3°. On the third, the temperature of the first was 95.9°, of the second 97.7°, of the third 93.2°. On the fourth day, the first was 95.9°, the second 98.6°. While the temperature of old erysipelas was, on the third day, 93.2°, and on the fourth day, 92.5°.

In *ambulant* erysipelas there was not observed any rule as to the direction in which it spread in 32 cases; it ascended in 7, descended in 6, spread laterally in 3, ascended and descended in 7, and spread in all directions in 9.

In 18 cases in which ambulant erysipelas acquired a *symmetrical outline*, this was accomplished on the first day of the disease in 4; on the second, in 2; on the third, in 2; on the fourth, in 2; on the fifth, in 1; on the sixth, in 5; on the seventh, in 1; and on the fourteenth, in 1.

With regard to the side of the body most frequently attacked, it was the median line in 45 cases—30 men, 15 females; on the right side in 82 cases—36 men, 46 women; and on the left side in 96 cases—47 men, 49 women.

With respect to the portion of the body on which it most frequently appears: in 29 idiopathic cases, it appeared on the face in 22—13 men, 9 women; in the upper extremity in 4—1 man, 3 women; in the lower extremity in 3—2 men and 1 woman. In 201 cases of traumatic erysipelas, in appeared on the head in 67, on the trunk in 44, on the upper extremity in 42, on the lower extremity in 50; namely, on the face in 35 cases—23 men, 12 women; at the aural region in 10 cases—4 men, 6 women; on the scalp in 22 cases—14 men, 8 women; on the neck in 6 cases—3 men, 3 females; on the breast in 25 cases—all women; on the remainder of chest in 3 cases—1 man, 2 women; on abdomen, 2—a man and a woman; on the back, 2 cases—a man and a woman; on the nates, 5 cases—1 man, 4 women; on the genitals, 1 case—a female; at the axilla, 5 cases—1 man, 4 women; on the arm, 8 cases—6 men, 2 women; at the elbow, 4 cases—1 man, 3 women; on the forearm, 5 cases—2 men, 3 women; on hand, 18 cases—9 men, 9 women; on fingers, 2 cases—both females; at the groin, 16 cases—13 men, 3 women; on thigh, 4 cases—2 men, 2 women; on knee, 8 cases—4 men, 4 women; on leg, 15 cases—11 men, 4 women; on the foot, 6 cases—3 men, 3 women; on the toes, 1 case—a woman.

In 124 cases—59 men, 65 women—the erysipelas was confined to a single region; in 84 cases—48 men, 36 women—it occupied two regions; in 21 cases—8 men, 13 women—it occupied three regions; and in 3 cases—1 man, 2 women—it occupied four regions.

In 67 cases of erysipelas of the face, it was confined to that part in 15 cases, spread to scalp in 17, to the trunk in 30, to trunk and upper extremity in 4, to trunk and both extremities in 1.

In 22 cases in which it commenced in the scalp, it spread to the face in 6, to the face and trunk in 14, and to the face, trunk, and upper extremities in 2.

In 25 cases in which it commenced in the breast, it spread in 17, viz: to chest and neck in 7, to back and abdomen in 2, to the head in 4, to the upper extremity in 1, to the head and upper extremity in 1, and to head and both extremities in 2.

In 46 cases in which it commenced in the arm, it spread in 23 cases, viz: to the back in 15, from the back to the head in 3, from the back to other arm in 2, from back to other arm and head in 2, to the other extremities in 1.

In 50 cases in which it commenced in the lower extremity, it spread in 18 cases, viz: to the trunk in 13, by the trunk to the other extremity in 4, and by the trunk to other extremity and head in 1.

The following table gives the mean and daily frequency of pulse, the influence of sex and age, and the number of observations:—

Day of disease.	Frequency of pulse.	Number of observations.	Maximum frequency.	Minimum frequency.	In men.	Number of observations.	In women.	Number of observations.	Over 30 years.	Number of observations.	Under 30 years.	Number of observations.
1	117	83	176	70	110	37	122	46	107	29	122	54
2	108	83	140	75	103	39	113	44	104	29	110	54
3	104	69	140	68	100	28	107	41	99	24	107	45
4	104	76	144	64	98	32	109	44	98	29	108	47
5	103	58	195	60	94	29	111	29	94	23	108	35
6	103	51	155	52	96	22	109	29	95	17	107	34
7	101	48	180	50	97	24	105	24	...	...	...	...
8	100	43	132	68	92	22	108	21	...	...	...	...
9	95	33	132	68	87	16	102	17	...	...	...	...
10	98	25	140	68	85	8	104	17	...	...	...	...
11	93	24	132	60	81	10	102	14	...	...	...	...

It not unfrequently happened that the pulse, after having fallen for some days, is again increased. This second acceleration occurred in women and the young on the fourth and fifth days; in men and the aged on the sixth and seventh days. Of 66 cases in which this increase was, on attentive examination, observed on one or other of these days, in 18 no cause was detected to which the increased frequency of pulse could be attributed. In 17 of the remaining cases, on the day on which the increased frequency of pulse was observed, the disease assumed a fatal tendency; in 6, typhoid symptoms appeared; in 3, inflammation of thoracic or abdominal organs; in 2, it was complicated with traumatic delirium; in 2, with hectic fever; in 6, it coincided with a fresh eruption of erysipelas; in 5, with fresh delitescing; in 7, with a spreading from the trunk to the head.

It was found that, in erysipelas of the head—as a mean of 29 observations—the pulse was, on the first day of the disease, 109; while elsewhere—as a mean of 54 observations—it was 121. On the second day, in erysipelas of the head, the pulse—as a mean of 33 observations—was 104; elsewhere, as a mean of 50 observations, it was 111. The pulse, therefore, appears to be rather less frequent in erysipelas of the face and scalp; but the contrary is observed in erysipelas of the breast, for in this situation the mean frequency from 12 cases, on the first day of the disease, was 131.

The *respiration* was nearly always increased upon the first day of the disease; on the second and third days, it slightly decreased; on the fourth and fifth days, slightly increased again.

Delirium occurred in 65 out of 217 cases—41 in men, 21 in women. It was observed in 13 cases on the first or second day; in 21, on the third or fourth; in 19, from the 5th to 7th; in 7, from the eighth to the tenth; in 3, after the tenth; in 2, the day was not determined. On the day in which the delirium was observed, the erysipelas was principally seated in the head in 36 cases; on the trunk in 10 cases; on the upper extremity in 4 cases; lower extremity in 14 cases; and in 1 case, the seat was not determined.

Of Fenger's 260 cases, 33, or one-eighth, died:—

Day of disease,	2,	4,	5,	6,	7,	8,	9,	10,	12,	13,	14,	15,	17,	21,	23,	31,	36,	44.
Died,	1,	2,	2,	4,	2,	5,	4,	2,	1,	1,	1,	1,	2,	1,	1,	1,	1,	1=33.

Eight died with typhoid symptoms, 3 with nervous fever, 4 with arachnitis, 5 with peritonitis, 2 with arachnitis, pleuritis, and peritonitis, 2 with pneumonia, 1 with purulent metastasis, 1 with large critical abscess, 1 with eruption of fresh erysipelas, 1 with arteritis and phlebitis, 2 were complicated with delirium tremens, 2 with suppurative arthritis of knee, and 1 with hypertrophy of heart.

During a period of three and a half years, 4863 patients were admitted in the Fredericks Hospital; among these, 217 cases of simple erysipelas, of which 20 were instances of return of disease in the same individual, leaving 197 cases of primary attack. In the following table, Fenger gives the number of men of all

ages labouring under this disease, the number of various ages in the hospital, the relative frequency to 1000 of the disease at the various ages in men, the same as regards women, and then the relative frequency of the disease, as to age and sex, in both sexes.

Age.	MEN.				WOMEN.				Of 1000 patients of both sexes yearly attacked with erysipelas.	
	With erysipelas.	Patients in hospital.	Of 1000 yearly attacked with erysipelas.		With erysipelas.	Patients in hospital.	Of 1000 yearly attacked with erysipelas.			
0–7	1	50	20	31	2	40	50	74	33	48
8–15	1	197	5		8	116	69		29	
16–20	18	405	44		21	265	79		58	
21–25	24	648	37	36	27	342	79	63	52	45
26–30	14	444	32		10	244	41		35	
31–35	5	406	12	18	9	122	74	49	26	27
36–40	7	253	28		3	121	25		27	
41–45	11	229	48	38	3	70	42	29	47	35
46–50	4	165	24		2	101	20		23	
51–60	12	229	52	42	5	142	35	40	44	41
61–70	3	107	28		4	96	42		34	
Above 70	0	19	...		2	34	59		38	
Uncertain	1	16	...		...	2	0		...	
Total	101	3168	32		96	1695	57		41	

In regard to the season most favourable to the occurrence of erysipelas, Fenger found that, from November to April, 22 cases in 100 occurred, and from May to October, 18 cases. In 1838, which, in England, was a year characterized by its low temperature and unusual amount of moisture throughout, the deaths from erysipelas were considerably above the average. The deaths during winter, with an average temperature of 36°, were 106—57 males, 49 females; during the spring, with an average temperature of 53°, 105—57 males, 48 females; during the summer, with an average temperature of 61°, 88—43 males, 45 females; and during the autumn, of which the temperature is not given, 106—61 males, 45 females.

To show that the disease is one of the *cold seasons*, Dr. Bird presents the following statement:—

	Winter.	Spring.	Summer.	Autumn.	
Average of 10 years	101.00	87.0	79.0	98.0	
Weekly average . .	7.10	6.9	6.1	7.7	
1848	195	129	128	126	cases of deaths from erysipelas.
1849	127	113	99	109	" "
1854	96	115	109	128	" "
	418	367	336	363	

Duration of the disease, to the day when the pulse returned to its normal beat, and a healthy appetite was experienced, in 191 cases was as follows:—

Day	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	26,	27,	34,	uncertain.
Cases . . .	3,	9,	12,	10,	10,	8,	15,	7,	16,	8,	21,	11,	10,	6,	5,	8,	2,	3,	6,	4,	2,	1,	2,	1,	5.

Thus one-half (96) of the cases terminated favourably by the tenth day, which may be taken as the *probable* duration of the disease.

During four years, 1838–'41, 260 cases of erysipelas were observed, namely:—

	Cases.	Died.	Convalescent on the 9th day.
In 1838 . . .	30	4 = 1 in 7.5	10 = 1 in 3.0
" 1839 . . .	75	9 = 1 in 8.3	20 = 1 in 3.8
" 1840 . . .	82	8 = 1 in 10.3	35 = 1 in 2.3
" 1841 . . .	73	12 = 1 in 6.1	27 = 1 in 2.7

In 1841, the disease was so serious that, of 69 deaths from all diseases, 12 were from erysipelas; nor did any single disease take off half so many as this. The following was the ratio in the several months:—

In December, of 30 sick, 4 died, and 12 were convalescent on the 9th day.
" January, of 26 " 2 " 12 " "
" February, of 19 " 2 " 8 " "

Total cases in the three months, 75; total deaths, 8 = 1 in 9.4; total convalescent by ninth day, 32 = 1 in 2.3.

In March, of 14 sick, 2 died, and 2 were convalescent on the 9th day.
" April, of 26 " 5 " 9 " "
" May, of 12 " 2 " 3 " "

Total cases in the three months, 52; total deaths, 9 = 1 in 5.8; total convalescent by 9th day, 14 = 1 in 3.7.

In June, of 18 sick, 1 died, and 6 were convalescent on the 9th day.
" July, of 20 " 4 " 7 " "
" August, of 17 " 2 " 6 " "

Total cases in the three months, 55; total deaths, 7 = 1 in 7.9; total convalescent by 9th day, 19 = 1 in 2.9.

In September, of 19 sick, 3 died, and 6 were convalescent on the 9th day.
" October, of 26 " 1 " 12 " "
" November, of 33 " 5 " 9 " "

Total cases in the three months, 78; total deaths, 9 = 1 in 8.7; total convalescent by 9th day, 27 = 1 in 2.9.

With regard to the influence of sex, it was found that, of 217 cases—111 men and 106 women—of the men, 16 died, = 1 in 6.9; of the women, 10 died, = 1 in 10.6. While of the men, 40 = 1 in 2.8 were convalescent on the 9th day, and of the women, 40 = 1 in 2.7.

With regard to the influence of age, it was found that of—

3 cases in patients of 7 years and under, none died, and 2 were convalescent on the 9th day.
9 " " 8 to 15 years, 2 " 4 were convalescent on the 9th day.
39 " " 16 to 20 " 2 " 16 were convalescent on the 9th day.
51 " " 21 to 25 " 4 " 22 were convalescent on the 9th day.

Thus of 102 cases in patients of 25 years and under, 8 = 1 in 12.8 died, and 44 = 1 in 2.3 were convalescent on the 9th day.

24 cases in patients of 26 to 30 years, 1 died, and 6 were convalescent on the 9th day.
14 " " 31 to 35 " 0 " 8 were convalescent on the 9th day.
10 " " 36 to 40 " 2 " 8 were convalescent on the 9th day.

Thus of 48 cases of patients of 40 years and under, 3 = 1 in 16 died, and 22 = 1 in 2.2 were convalescent on the 9th day.

14 cases in patients of 41 to 45 years, 4 died, and 3 were convalescent on the 9th day.
6 " " 46 to 50 " 2 " 0 were convalescent on the 9th day.
17 " " 51 to 60 " 3 " 9 were convalescent on the 9th day.
7 " " 61 to 70 " 3 " 2 were convalescent on the 9th day.
2 " " beyond 70 " 2 " 0 were convalescent on the 9th day.

Thus of 46 cases in patients between 41 and 70 years, 14 = 1 in 3.3 died, and 14 = 1 in 3.1 were convalescent on the 9th day.

Of uncertain age, one case—which terminated fatally.

In forming a prognosis in erysipelas, the condition of the pulse is of great importance. To determine this question, Dr. Bird gives the following table:—

Mean frequency of the pulse.	In fatal cases.	Number of observations.	In those convalescent on the 9th day.	Number of observations.	In those convalescent after the 10th day.	Number of observations.
First day	109	9	117	37	119	37
Second day	106	11	105	27	111	45
Third day	110	10	98	24	107	35
Fourth day	110	12	91	18	108	46
Fifth day	112	12	94	12	102	34
Sixth day	131	7	92	5	100	39
Seventh day	122	7	85	5	99	36
Eighth day	113	7	80	1	97	35

We have selected the foregoing as among the most interesting of the statistical results contained in the volume before us, in respect to certain important questions touching the pathology of erysipelas. The entire work of Dr. Bird is deserving of an attentive study on the part of all who desire to make themselves conversant with a disease which, even in sporadic cases, may, if its true character be misunderstood, give a great deal of trouble to the physician, and prove fatal to the patient; and which, when it prevails epidemically, is to be ranked among the most formidable of the maladies to which man is liable. D. F. C.

ART. XX.—*An Essay on Wasting Palsy; Cruveilhier's Atrophy.* By WILLIAM ROBERTS, B. A., M. D., Lond.; Physician to the Manchester Royal Infirmary, Fever Wards, and Lunatic Hospital; Lecturer on General and Morbid Anatomy and Physiology at the Manchester Royal School of Medicine, etc. With four lithographic plates. 8vo. pp. 210. London, 1858.

THE disease treated of by Dr. Roberts has, for its most striking characteristic, a wasting away with consequent loss of power of the muscles of animal life, resulting independently of lead poisoning.

It is a somewhat remarkable circumstance that the affection should have been until very recently almost entirely overlooked by the physicians of Great Britain, and of our own country—particularly when we consider the amount of attention it has attracted on the continent of Europe, and the fact that by Cruveilhier, Aran, Duchenne, of Boulogne, Oppenheimer, Wachsmuth, and a number of others it has been made the subject of special study.

In the work before us will be found a well arranged abstract of the present state of our knowledge in respect to the nature, causes, and treatment of wasting palsy, or, what it might with more propriety be called, muscular atrophy. He has culled with much industry, from every available source, the leading facts that have been observed and recorded, with such as have fallen under his own immediate notice, adapted to throw light upon its etiology, pathology, and therapeutics—these he has collated with much care and no little judgment, with a view to determine their legitimate teachings. In the performance of this work, Dr. R. has rendered an essential service to a large class of practitioners, who have not the leisure nor the opportunity of consulting the several publications from which he has derived his materials.

Wasting palsy, as already remarked, is confined strictly to the muscles of the life of relation—those that are under the control of the will. Although, in the majority of instances, it is confined to certain of the voluntary muscles, it may, nevertheless, involve in the same individual nearly all of them. Generally speaking, as Sir Charles Bell has remarked, it is "an affection of the muscles combined in action," but by no means invariably so.

In no case upon record have all the muscles of the body been found affected in the same individual—a few of the muscles, as those of mastication, and those of the eye, including the levator palpebræ, would seem to be altogether exempt from the disease.

The invasion of wasting palsy is usually slow and insidious—it creeps on unawares, and the subject of its attack only becomes aware of its presence on the occasion of some marked failure in the muscular power of certain—perhaps many muscles. When it has made some progress it is easily detected, either by the visible changes produced in the external conformation—by the absorption of the muscular masses, the displacement of bones, and the abnormal position of joints from loss of muscular support—or, by the failure of certain movements which contribute to outward expression or inward function, such as the facial physiognomy, deglutition, vocalization, or respiration; all of which depend on the operation of striped muscles under voluntary sway.

"The simple *disappearance of the muscles*," Dr. R. remarks, "causes very notable changes of configuration. The symmetrical rounded contour gives

place to a lean and withered aspect; the bony levers stand out in unaccustomed distinctness, and impart to the limb the appearance of a skeleton clothed in skin; but the skin itself, and the subcutaneous cellular tissue, have undergone no change, and cannot be distinguished from the integument of healthy parts. But loss of substance is not the only anatomical change observed. The natural equilibrium of the muscular forces is overset by the *unequal wasting* of the muscles; those less atrophied overcoming the resistance of those more deeply diseased. Hence arise very considerable, and sometimes peculiar, distortions of the heart, trunk, and extremities."

"But, perhaps, the most remarkable of all the anatomical changes are seen in the face, when the muscles of expression are destroyed. The intelligent countenance is veiled, as it were, by an impenetrable mask; no emotion changes its unvarying aspect—always solemn, stolid, and unmoved. The eyes, however, are spared, and by their movements alone (in the last periods) the immortal part holds some imperfect communion with the world around."

Wasting palsy frequently attacks the muscles of the interior, and a new class of morbid phenomena are observed.

"The tongue is often attacked, and a slight falter in the speech is one of the earliest indications that the disease is about to assume the general character; indeed, in two instances this was its starting point. Difficulty in masticating and swallowing food follows. The tongue can no longer move the morsel in the mouth in chewing; the patient fails to protrude it properly, and it has a soft, limp feel, and, not unfrequently, is the seat of violent tremblings. The involvement of the laryngeal muscles is known by a change in the voice, which loses its register, and is, finally, reduced to a single note. When the diaphragm and intercostals are reached, there are violent and suffocative fits of coughing; the play of the chest is reduced to a slight movement in the lower ribs, and the least impediment to respiration is now necessarily fatal."

Dr. R. presents in tabular form the most important particulars observed in one hundred and five cases of the disease. These show that the muscles of the trunk are less liable to be affected by it than those connected with the extremities; while of the latter, the muscles of the upper are far more liable than those of the lower limbs. The right arm is more frequently attacked than the left, and the hands oftener than the shoulders. When the disease occurs in the shoulders, it almost always includes the upper arm; another favourite combination is the forearm and hand. In no instance upon record have the muscles of the upper and forearm been associated in cases of muscular atrophy as the sole sufferers.

"In the upper limbs it may be said that the morbid action radiates from two centres; one in the hand, from which the forearm is invaded, and the other at the shoulder, from which are reached the muscles of the upper arm, and those which brace the shoulder-blade to the ribs. When the hand and forearm are destroyed, the evil does not then pass up the arm, but starts away to the shoulder or to the opposite hand. In the same way, when the shoulder is first attacked, the disease does not descend along the upper and forearm to the hand, but, passing over the elbow, it begins afresh in the ball of the thumb, and from that focus spreads up the limb, so that the parts latest reached are those about the elbow, especially the masses that take their rise from the humeral condyles. Whether a corresponding peculiarity in its extension exists in the lower extremities cannot as yet be ascertained, owing to the limited number of observations."

Dr. R. considers the symptoms of wasting palsy under two heads—lesions of motility, and lesions of sensibility. The lesions of motility are chiefly loss of power—with fibrillary tremors, cramps, twitches, and diminution of the electric contractility.

The loss of power is dependent upon the muscular atrophy, and goes on increasing with the diminution in the bulk of the muscle. The muscular vibrations consist in slight convulsive twitchings or quiverings of individual muscular bundles—they impart no movement to the entire muscle, but undulate over its surface, beneath the skin, in quick momentary tremors. They become more vivid and frequent under the application of cold, or when the affected muscle is pressed upon, or the limb is raised. The same thing happens when the skin is

filliped, or tickled, when violent movements are attempted, or a galvanic current is passed through the part. They are not continuously present, while their intensity varies from time to time. They cease upon the entire destruction of the muscle. They generally prevail spontaneously, but sometimes only when excited by cold air, pinching, or tickling.

Cramps and twitches differ from the tremors just referred to by producing a shortening of the entire muscle, and consequently a movement of the limb or part to which it is attached. They are sometimes accompanied with pain, especially at night, preventing sleep. Generally, they cease without producing any permanent mischief; occasionally, however, they cause the muscle to hold the joints in some unnatural position, giving rise to persistent deformity. They are to be considered as complications dependent on cold, and form no essential part of the symptomatology of the disease.

The electric contractility of a muscle affected with atrophy gradually diminishes with the diminution of its voluntary power.

Lesions of sensibility.—In uncomplicated cases the sensibility at the parts affected is unchanged. When the tongue is attacked with atrophy, neither its gustatory sense nor common sensibility is impaired. According to Duchenne, the special muscular sense survives to the last. There is neither pain, numbness, nor any other abnormal feeling. In very many—though still not in the majority of cases—pain, sensitiveness to cold, and even slight numbness are added to the more constant symptoms. Of these occasional symptoms, pain is by far the most common. Sometimes it is a slight wandering pain in the neighbourhood of the affected muscles; at other times, it is sharp and lancinating, having all the characters of neuralgia; or it may be of an aching kind, affecting the joints and substance of the muscles, resembling that of rheumatism. In several cases it marked the onset of the disease, and ceased as the atrophy became apparent; more generally it succeeded the latter, and marked its presence. It most commonly came and went at intervals, or continued for a time and then ceased entirely.

Pains in parts at a distance from the seat of disease are occasionally complained of; but of trifling intensity or evanescent in duration, and consequently of minor importance.

The general health—so far as regards the due exercise of the intellectual, digestive, circulatory, and nutritive functions—save, in respect to the latter, the atrophied muscles; in a word, the whole of the organic functions are performed with perfect regularity. Occasionally, as already explained, respiration is very seriously compromised; and, in cases of long standing, serous effusion takes place in the affected limbs, and the skin assumes a livid hue. These latter conditions are always the result of secondary and purely mechanical causes.

The most common complications of wasting palsy are neuralgiæ, either of the nerves of the diseased part, or of the opposite limb, or of the face. In some rare cases the disease has been found complicated also with tuberculosis, albuminuria, and mollities ossium.

The disease may terminate in *recovery*, with very slight, perhaps no deformity; permanent *arrest*, with more decided deformity, and death. When wasting palsy affects the muscles of the trunk, its termination is very generally fatal. In twenty-five cases only *four* are reported to have recovered, and *three* permanently arrested, *eighteen* having terminated fatally; while in twenty-four cases of partial wasting palsy, *five* recovered, *nineteen* were permanently arrested, and *none* terminated fatally. According to Dr. Roberts, the partial form in no way menaces life, unless, when by an extension of the atrophy, it passes over into the more fatal type.

The mean *age* of the patients in 88 cases of wasting palsy was 30½ years. In the partial atrophies—49 cases—the average age was 32¼ years; and in the general—39 cases—28¼ years. General atrophy is confined to no particular age, but occurs from childhood upwards, whereas the partial form is very rarely met with in individuals under adult age or over 50.

Of 99 cases in which the *sex* is mentioned, 84 were males, 15 females. In 70 instances the *occupation* and *social position* of the patients are given. Of these, 19 were in easy circumstances, and not mechanics, agriculturists, or labourers;

20 were mechanics, etc., including tailors, seamstress, and shoemakers; 34 were engaged in domestic and farm service, washing, housewifery, &c.; 2 were sailors, and several common labourers.

That the disease is common to the members of certain families, and hence probably due to a hereditary predisposition or taint, is proved beyond a doubt by a number of facts upon record. These show also that when hereditary the disease most generally attacks males, and is of the general or more fatal form.

The subjects of the disease have for the most part been individuals of excellent constitution, of good physical development, and gifted with ordinary intelligence. In a few instances it is said that the patients had been affected with a certain weakness from youth; but in the great majority of these cases the hereditary predisposition was evident, while one was not a simple case, being complicated with mollities ossium.

Of the other occasional causes the chief are undue muscular exertion, and exposure to cold.

Though the rule is well established that active muscular exertion is one of the most important conditions for the origin of the disease, it is by no means a necessary one, as exceptions frequently occur. So, also, it will be found that although in general the muscles most strained in the daily labour or occupations of the patient are those first attacked, this is not invariably the case. Persons following the same handicraft are not always seized in the same muscles.

Wearing damp clothing; rapid cooling of the perspiring surface; exposure to damp and cold, and to storms of rain and cold—all these have been distinctly shown to be effective exciting causes of wasting palsy.

When the atrophy is produced by cold it is more apt to extend to the muscles of the trunk than when it arises from overwork. It is a far more serious matter, therefore, for the atrophy to be traced back to cold, or to a wetting, than to over fatigue of the muscles. In more than one instance the disease is alleged to have been produced by cold combined with fatigue.

The pathological condition of the nerves and muscles of the life of relation—being those only which exhibit morbid changes in wasting palsy, have been examined with some care.

The muscles have been found wasted away to a greater or less extent, and changed in colour, being of a pale red, ochrey red, pale yellow, or buff; all of which shades may be present in the same patient. Some of the muscles, again, present yellow streaks of fat between the redder bundles. In other instances some muscles appear atrophied, without any trace of fatty degeneration, while others are streaked with fat, and others are converted into masses of pure fat, with scarcely a trace of muscular fibre.

"There would seem to be, in fine," as Dr. R. remarks, "a degeneration of the muscular fibrillæ; these gradually give place to a granular amorphous substance, which, in its turn, gives way to fat molecules; and, finally, these disappear, and the empty sarcolemma, if it have not previously deliquesced, thins away out of being, and nothing is left but the framework of connective tissue which held together the muscular bundles. In some instances the degeneration would seem entirely granular, and at no time fatty; in others fat is present in larger proportion, and sometimes it is exceedingly abundant."

In regard to the varying and conflicting results of the pathological examination of the nervous system in muscular atrophy, they are thus summed up by Dr. Roberts:—

"The nervous system was examined in thirteen cases.

"In two the spinal centre was sound; but the anterior roots and peripheral distribution of the muscular nerves were extensively diseased. In three cases there was inflammatory softening of the cord; accompanied, in two of them, with fatty degeneration and destruction of the anterior roots; and in one of these, of the peripheral muscular branches also. In the third case, the anterior roots and peripheral branches were healthy. In one case, there was amyloid degeneration of the cord, confined to the posterior median columns, and a granular degeneration of the peripheral muscular branches, but with entire preservation of the anterior roots. In two, the nervous centres and anterior roots were found, on the most rigorous investigation, perfectly sound. In the remaining four cases,

the nervous system was pronounced healthy so far as the examination was conducted."

Dr. R. enters into a somewhat extended inquiry as to the true pathology of wasting palsy; we can afford room only for his general conclusions, which are as follow:—

"We may look, therefore, for three orders of phenomena in wasting palsy.

"1. *Primary or direct.*—These are, destruction of muscle and consequent loss of power. They are necessarily always present, and, in the simple cases, are the sole factors in the problem.

"2. *Secondary or reversed.*—These include atrophy and fatty degeneration of the motor nerves, together with softening or other change in the spinal cord. These are not invariably present. Probably some of the neuralgic pains should find a place here; the nervous filaments ministering to the muscular sense, being involved in the general devastation, may be the source of those severe pains sometimes experienced in the substance of the affected muscles; but I am disposed to believe that most of the abnormal sensations and movements are the expression of the next order.

"3. *Tertiary or reflected.*—These may be produced through irradiation of impressions conveyed to the spinal centre by the nerves of the special muscular sense; or they may be the direct consequences of the secondary organic changes just described as going on in the part of the cord where the nerves of the decaying muscles originate, whereby the contiguous sound portions are irritated. In both these ways abnormal movements and feelings are provoked—undue sensitiveness to cold, neuralgic pains along the nervous trunks or in the joints, twitches, cramps, contractions, and fibrillary tremors.

"As a corollary to the foregoing demonstration—as I hope I may call it—stands the explanation of what has been a stumbling-block to Dr. Eisenmann, namely, the want of proportion sometimes observed between the wasting of the muscles and the loss of power, and the somewhat sudden advent of the latter in a few cases. The irritation of the cord, superinduced as above described, reacts in an untoward manner on the healthy muscles, or on the uninjured fasciculi of the diseased ones. When there is neuralgic pain the lowered muscular power occurs only as its usual accompaniment; and when there is none, the debilitating effect is still produced in the same way, and finds its parallel in the ephemeral palsies produced similarly by intestinal parasites or hysteria: they are all *derived* phenomena, either reflected viâ the spinal cord from the decaying muscles, or to be referred to the direct effect of the secondary organic changes taking place in that centre."

In regard to the *diagnosis* of muscular atrophy; when fully developed the disease presents a characteristic appearance which it is impossible to mistake. In its early stage the physiognomy of the disease is less striking.

The partial form may be confounded with paralysis from injury to or *pressure* on a *motor nerve*. From this, however, it may be distinguished by the fact that such paralysis and its consequent atrophy is strictly limited to the parts supplied by the affected nerve; and, if the nerve be a mixed one, by an accompanying loss of sensation.

Lead palsy has strong points of resemblance with muscular atrophy. The first, however, is, comparatively speaking, more sudden in its invasion; while the precursory phenomena are very different from those of wasting palsy. Lead palsy invades the muscles in a certain order. The extensors are its special prey, and, unless the disease has become general, the loss of power is entirely confined to them. The loss of power, also, is altogether disproportionate to the atrophy in recent cases—the wasting being *posterior* to the failure of strength—a limb may be entirely disabled by the poison of lead, while the mass of the muscles is still undiminished. A muscle palsied by lead loses entirely, or nearly so, its electric contractility; in cases of wasting palsy, this is not the case.

The palsy which follows the endemic colic of certain countries may be distinguished from muscular atrophy by its previous history, disclosing antecedent colic, brusque invasion of the loss of muscular power, and the fact that the wasting of the muscles followed, not accompanied, the palsy.

"Wasting palsy, when extensively diffused, is liable to be confounded with

general lead poisoning, and with the *general paralysis of the insane* under certain circumstances. With the former, confusion is scarcely possible with ordinary care; the physiognomy of the two diseases is altogether different, and the multiform signs and symptoms of lead intoxication cannot be mistaken or overlooked. In wasting palsy, on the contrary, the economy, as a whole, shows no indication of a blood-poisoning; but exhibits unimpaired soundness of all the nutritive functions, with the sole exception of the muscles. In long standing cases of general lead poisoning, the disease involves not only the muscles, but also the adjacent tissues."

In the general palsy of the insane, although the muscles waste and lose power, the limbs suffer uniformly, there is none of the *dissecting* character so remarkable in wasting palsy. The electric contractility is unimpaired in the former, while it is depressed in the latter affection.

"In other forms of cerebral palsy, their sudden advent, their range, the implication of the sensory nerves, the absence of emaciation in the affected muscles, the lively reflex activity of the latter, and their ready response to the electric stimulus, prevent the possibility of error."

The *essential paralysis of infancy and childhood* closely resembles wasting palsy; but it wants the dissecting character—all the muscles are equally affected, and the previous history of the case evinces a striking discrepancy with that of wasting palsy.

In cases of paralysis from injury or disease of the spinal cord, the loss of power is attended with some modification or loss of sensation. It is confined to, and uniformly distributed over, the parts below the seat of injury or disease. It often involves the sphincters of the bladder and rectum; it has come on suddenly; it is attended with rigid spasms; the electric contractility is preserved in the muscles; the occurrence of any of these conditions or circumstances is incompatible with the idea of wasting palsy.

Passing over the chapter devoted to the subject of *prognosis* in wasting palsy, we must close our notice of the very interesting work of Dr. Roberts, by quoting in full the summary of the treatment the author has found best adapted for the removal or arrest of wasting palsy.

"Adopting," he remarks, "the view of the pathology of wasting palsy advocated in this essay, the treatment naturally divides itself into two lines of indication. The object of the first is to arrest or cure the atrophy of the muscles; and that of the second, to combat the secondary phenomena. In dealing with the primary disease, our first endeavour must be to seek out the *exciting cause*, and obviate, if that be practicable, its continued operation. The handicraftsman must immediately renounce the practice of his mechanical art; the labourer must take off the strain from the overworked members. If cold and damp be the original excitant, they must be sedulously avoided in future, to escape the risk of a recrudescence or relapse. The *direct* treatment must have for its end, in the active stage of the malady, to restore the nutritive operations from their depraved estate to their original healthy tenor. This is accomplished by a judicious combination of perfect repose and regulated stimulation. Experience has shown that, for the latter purpose, no remedy approaches *galvanism*, which should be applied to the muscles daily, or every other day, in the manner directed by Duchenne. With galvanism may be combined gentle frictions of the parts affected, with some stimulating liniment; and if the means be at hand, warm sulphuretted or saline baths may be employed occasionally, as adjuvants to the local applications. When the disease has become stationary, more violent stimulation by electricity and friction must be resorted to, and cold bathing, with enforced exercise of the muscles, may be tried, if other means fail of effect. Remedies should be employed without loss of time, for when the atrophy has extensively affected the muscles of the trunk, or has remained stationary for a lengthened period, the chance of recovery diminishes in an accelerated ratio.

"The *secondary* phenomena, neuralgic pains, spasms, &c., are most effectually subdued by warm baths, and inunctions; or, if they obstinately persist, by morphia-dressed blisters over the painful tracks. Any ailment of the general system, or concurrent and independent disease, must be dealt with in accordance with the recognized canons of therapeutics." D. F. C.

ART. XXI.—*Journal de la Physiologie de l'Homme et des Animaux.* Publié sous la Direction du Docteur E. BROWN-SÉQUARD. Tome premier, Numero IV. Octobre, 1858. Tome deuxième, No. 5, Jan. 1859.

WITH the number for October, 1858, the first volume of M. Brown-Séquard's journal is brought to a close, and we must congratulate the editor on the successful career through the past year of the periodical he had the courage to initiate and the perseverance to continue. We presume it may now be considered as firmly established, and we trust it may long continue to represent the important branch of medical science to which its pages are devoted.

The number to which we refer compares favourably with those which have preceded it. The original memoirs are twelve in number, as follows:—

1. On the Variations in the Color of Venous Blood. By M. Cl. Bernard. (Two memoirs.)
2. Researches on the possibility of recalling Temporarily to Life Persons who have Died of Diseases. By M. Brown-Séquard.
3. On the Nutrition of Plants; with Remarks on Nutrition in Animals. By M. Verdeil.
4. Memoir on Hybridity in general, on Specific Differences in Animals, and on the Hybrid of the Rabbit and Hare. By M. P. Broca. (2d part.)
5. Experimental Researches on the Physiological Properties and Uses of the Red and Black Blood. By M. Brown-Séquard. (Conclusion.)
6. Researches on the Erectile Organs of the Female, and on the Tubo-Ovarian Muscular Apparatus in their connections with Ovulation and Menstruation. By M. Ch. Rouget. (Conclusion.)
7. Facts tending to show that the Anterior Columns of the Spinal Cord serve for the Transmission of Sensitive Impressions. By M. Nonat.
8. Researches relative to the Physiology and Pathology of the Annular Protuberance. By M. Brown-Séquard. (2d part.)
9. Note on the Corpuscles of Bone, and on the Development of Secondary Bone. By M. Ch. Rouget. (With a plate.)
10. Note on the existence of Rhythmical Contractions in the Excretory Ducts of the Principal Glands in Birds. By M. Brown-Séquard.
11. On the Effects following Ligature of the Œsophagus in Animals. By M. Trousseau.
12. Remarks on the Production of the Phenomena following Ligature of the Œsophagus. By M. Brown-Séquard.

Besides these memoirs, this number contains the usual variety in the way of extracts from other journals, translations, abstracts, &c.

The two memoirs by Bernard on the change of colour in venous blood are continuations of that previously published on the same subject. They are of so much interest, and are written in so philosophical a spirit that we are tempted to place an abstract of them before our readers.

Over a year since Bernard announced to the Academy of Sciences the important fact that when a muscle contracts, the venous blood flowing from it is very black, whilst that which flows from a gland in action is, on the contrary, of a bright red hue, quite identical in appearance with arterial blood. From his researches it follows that the blood of those glands which are not constantly in action is black or red according to the physiological condition which exists—that is, according as the gland is in a state of repose or activity. At the time Bernard simply announced the discovery of these facts. In the present memoirs he furnishes an explanation of the primary cause of the variation in the tint of the glandular venous blood, and also details experiments instituted for the purpose of ascertaining the difference in composition between the red blood of a gland in action and the black blood of the same gland in a condition of repose.

In regard to the cause of the change of colour, we quote the following passage as embodying the physiology of the subject.

"I desire to show at present that the particular chemical conditions which

render the venous blood of the glands red or black are due to the influence of two nerves having distinct points of origin and possessing actions in some respects antagonistic. That is to say, in other words, that there exists a glandular nerve which causes the venous blood to become red, and another nerve which by its influence renders it black. I will presently make it apparent that each of these nerves, in order to act chemically on the blood, modifies in a different manner the mechanical phenomena of the capillary circulation, so that a necessary correlation—easy to understand—is established between the chemical modifications which the blood undergoes in the organic tissues and the mechanical conditions of the capillary circulation which are under the control of the nerves."

In illustration of these views, he selects the submaxillary gland of the dog. The nerve which possesses the property of rendering the venous blood of this gland red, is a small branch arising from the lingual or gustatory branch of the fifth pair after it has been joined by the corda tympani. This tympanico-lingual branch accompanies the excretory duct, and is distributed to the substance of the gland.

Now, if by means of galvanism or other means exerted through this nerve, the gland is brought into a state of activity, the venous blood coming from it which previously was of a black color is rendered of a bright red hue. If the action is sufficiently energetic, this venous blood presents the same appearance as that of the arteries. The result constantly follows, and must be regarded as a physiological fact. It is also as definitely established that as soon as the preponderating influence of the tympanico-lingual nerve is withdrawn the gland ceases to secrete, and the venous blood becomes black.

The same result as that above detailed follows from impressions made upon the tongue by sapid substances. By such influences the venous blood of the submaxillary gland rapidly becomes red, but if the tympanico-lingual branch be cut as it is given off from the lingual nerve, no reddening of the venous blood is produced, and no matter how strong the impression made upon the tongue, the blood remains black.

The black colour which ensues in the glandular venous blood is not, however, due to a simple cessation in function of the gland. It is caused by another nerve which is constantly exerting its influence in a manner antagonistic to that of the tympanico-lingual. This nerve is derived from the great sympathetic. If it is divided its influence is cut off, and the tympanico-lingual having no force opposed to it rapidly causes the blood to become red. By irritating this branch of the sympathetic, its influence is made to predominate over that of the tympanico-lingual, and the venous blood of the gland is in consequence again made black. Nothing in the whole range of physiological science is capable of more conclusive demonstration than the facts we have stated.

In regard to the mode of action of these nerves, we have also, through M. Bernard's researches, very positive results. The principle which he enunciates is as follows:—

"The mechanical conditions of the capillary circulation determined in the submaxillary gland by the tympanico-lingual nerve, and by the great sympathetic, are exactly inverse."

Thus when the former of these nerves is excited, the blood flows through the gland more rapidly and becomes red; if, on the contrary, the irritation is applied to the sympathetic branch, the circulation is retarded, and the blood becomes black. Through the influence of the tympanico-lingual nerve the capillaries are rendered larger, and this dilatation may be so great as to allow the blood from the artery to enter the vein without losing the impulse derived from the heart, and it may actually be seen to flow *per saltum* from the cut extremity of the vein.

On the other hand, the sympathetic nerve contracts the capillaries and impedes the passage of the arterial blood into the vein. From these facts, it is evident that the blood flowing from the vein on excitation of the tympanico-lingual nerve partakes very much of the character of arterial blood, hence its red colour, whilst that leaving the gland whilst the action of the sympathetic is predominant, is essentially of a highly venous nature.

In the second memoir, M. Bernard demonstrates conclusively by analysis, that the black venous blood contains much less oxygen than the red, and that this latter is not far removed from arterial blood in its degree of oxygenation.

We do not know a more beautiful exposition of the importance of experimental physiology than that given us by M. Bernard in these two memoirs. The conclusions are arrived at so exactly and positively as apparently to leave no ground for subverters to stand upon.

The other memoirs of the number before us, whose titles we have quoted, are all of them highly interesting, and will amply repay a careful perusal.

In the fifth number, the first of the second volume of this valuable journal, we have a collection of memoirs in no way inferior to those contained in any previous one. The titles of these are as follows:—

1. Experimental Researches on the artificial production of Bone by transplanting the Periosteum, and on the regeneration of Bone after resections and complete ablations. By M. Ollier. (With two plates.)
2. On a new Function of the Placenta. By M. Claude Bernard. (With one plate.)
3. On some points in the Anatomy and Physiology of the White Corpuscles of the Blood. By M. Charles Robin.
4. Researches on the Abdominal Nervous System of the *Caïman a Museau de Brochet*. [Alligator Mississippiensis.] By M. Jacquart.
5. New Researches relative to the transmission of Sensitive Impressions by the Spinal Cord. By M. Brown-Séquard.
6. Congenital Inequality of the two Halves of the Body—Singular Physiological Consequences. By M. Paul Broca.
7. On the Amyloid Bodies and their *Rôle* in the Constitution of the Animal Tissues. By M. Ch. Rouget.
8. Experimental and Chemical Researches on some points in relation to Asphyxia. By M. Brown-Séquard.
9. On the Source of the Glycogenic Matter in the Herbivora. By M. A. Sanson.
10. On some cases of Disease of the Skin depending upon Nervous Influence. By M. Charcot, with remarks by M. Brown-Séquard.
11. On Rhythmical Movements in the Diaphragm and Muscles of Animal Life after their separation from the Nervous Centres. By M. Brown-Séquard.
12. On the presence of the Foramen of Botal in the Heart of the healthy Adult. By M. J. W. Ogle.
13. Researches on the Physiology and Pathology of the Annular Protuberance. By M. Brown-Séquard.

In addition to the original memoirs, we have the usual quantity of matter in the way of abstracts, translations, &c., much of which will be found of interest, and in order to supply the whole of M. Ollier's paper, part of the April number is appended to the present.

The results contained in the important and indeed remarkable memoir of M. Ollier have already been announced through other channels, but seem to be presented here in a more connected manner, and with more elaborateness of detail than previously. The fact that the periosteum is the regenerator of bone has long been known to physiologists and surgeons, but never before have we had such thorough demonstration of its truth as now through M. Ollier's researches. An abstract of his memoir will, we are satisfied, prove not unacceptable to our readers.

M. Ollier divides his experiments into three classes.

1st. Those in which the strip of detached periosteum was left more or less adherent to the bone. The strip was grafted among the muscles, or placed immediately under the skin, but it continued to receive vessels from the bone.

2d. Those in which the strip was entirely cut away from the bone, three, four, or five days after the transplantation, so as to interrupt all communication with the bone.

3d. Those in which the strip of periosteum entirely separated from the bone and the rest of the periosteum was immediately transplanted to neighbouring or distant parts of the body.

The tibia was chosen for the experiments of the first series. The general manner of proceeding was as follows, rabbits being the animals selected.

An incision was made along the crest of the bone, the muscles which covered the portion necessary to be exposed being carefully pushed aside. The periosteum was thus, in the first place, isolated from all the surrounding soft parts. The strip of periosteum which it was desired to detach was then marked out with the point of the scalpel, and dissected off from the bone beneath, but left attached by one extremity to the rest of the membrane. A situation was then selected either under the skin or among the muscles, and the band of periosteum was then securely fixed in its new position by a suture passing through the free extremity.

When the animal is vigorous, no inconvenience is experienced from the foregoing operation.

During the first two or three days the periosteal band gradually swells, and can readily be distinguished through the superimposed soft parts if the inflammation be not too great. At the end of three or four days it becomes more consistent, and in a short time is as resistant as cartilage. It sometimes acquires a considerable degree of thickness, and becomes as large as the tibia itself.

If after the lapse of from five to seven weeks, the animal subjected to an operation such as above described, be killed, a mass of true bone will be found to have grown from the under surface of the detached band of periosteum of circular, spiral, or such other shape as may have been given to the strip in the first instance.

If, however, the animal be old—five years for instance—the strip of periosteum exhibits but very little trace of ossificatian. Hence, as M. Ollier remarks, we have an additional proof that the osteogenetic faculty of the periosteum diminishes with age, though it is not altogether abolished.

From the second series of experiments similar results were obtained. Bone was found to have formed, though the strip of detached periosteum was entirely severed from its connection with the remainder, three or four days after the operation.

Even in the third series, in which the strip of periosteum was at once entirely separated from all connection with the bone, and only connected with the soft parts by a few muscular fibres, true bone was found growing from it six weeks after the operation. It was found that the osteogenetic faculty of the periosteum was not of the same degree in all parts of the body. Thus, in the transplantation of the pericranium but few ossific points were seen, and these were exceedingly small.

A great many important points are next discussed. These relate to the character of the bone obtained by the transplantation of the periosteum, its mode of development, &c. &c. In the second part the regeneration of bones after their extirpation, the reproduction of the articulations, &c., are considered.

From his researches, Mr. Ollier deduces the following conclusions, all of which are, we think, abundantly sustained by the facts he has established.

1st. The production of bone continues on the under surface of the transplanted periosteum. Moreover, when this membrane is grafted, new bone is obtained adherent to the bone to which the periosteum has been attached, or entirely independent, according as the periosteal band has been left continuous with the rest of the periosteum, or altogether detached.

2d. In transplanting strips of periosteum, bone is obtained of various dimensions and figures, such as circles, spirals, &c. &c., according to the extent and position of the strip. Entire control of the process of ossification is thus obtained, and it can, therefore, be directed at will.

3d. The bone thus obtained is true bone, constituted of the anatomical elements which characterize the osseous tissue, so that as organization advances these elements are disposed as in normal bone. There is thus formed a compact exterior layer, with a medullary cavity interiorly. This cavity is filled with marrow of the same character as that found in ordinary bone.

4th. The new bone is developed in the subperiosteal blastema which exists normally on the internal surface of the periosteum. This proposition is demonstrated by the examination of the development of the new bone, and by experimentation whence exact and conclusive results are obtained.

5th. The blastema is specially constituted of nuclei, free or inclosed in cells, swimming in a semi-liquid or finely-granular matter, and mixed with a greater or less quantity of fibrous elements.

These several embryonic elements are developed and multiplied in the primitive amorphous exudation furnished by the capillaries of the periosteum.

6th. A cartilaginous substance is met with when the subperiosteal product is observed during the first few days which follow the transplantation, but the growth of the new bone is effected without the intermediation of this element. This cartilage, moreover, differs in its anatomical elements from normal articular cartilage.

7th. The bone from which a strip of periosteum is removed, presents at the end of a certain time, an analogous membrane covering the denuded part.

8th. When a bone, or a fragment of bone, the periosteum of which is preserved, is removed (that is to say, the membrane being left in the wound adherent to the parts which normally surround it) this bone, or portion of bone, is more or less perfectly reproduced at the end of a certain time. The regeneration is in some cases very complete. The surrounding soft parts cannot supply the periosteum. They are not directly concerned in the process of ossification.

The production of bone is proportional to the amount of periosteum left in the wound. When the entire thickness of a bone is removed, this membrane alone can be looked to for the reproduction of the extirpated part.

9th. After the resection of the articular surfaces of two contiguous bones, a new articulation is formed if the capsule and the ligaments are allowed to remain connected with the periosteum of the resected bone. The two osseous extremities are regenerated separately.

Viewed from a surgical point of view, the importance of M. Ollier's researches can scarcely be over-estimated, and will be readily admitted by all intelligent surgeons.

M. Cl. Bernard's memoir is also of much physiological interest. As early as 1854, M. Bernard announced that the glycogenic function of the liver did not commence till a somewhat advanced period of fœtal existence. Nevertheless he found that from the commencement of organization, the tissues of the fœtus contained either sugar or glycogenic matter, which seemed to be essential elements in their development. Experiment satisfied him that this glycogenic matter did not come from the mother. There was, therefore, an obscurity in regard to its origin, which M. Bernard has been for a long time labouring to dispel, and finally with success.

For several years past, M. Bernard has examined the placentas of calves and sheep, obtained from the *abattoirs* of Paris, without ascertaining that they contained in any part the least trace of glycogenic matter. Notwithstanding this want of success, he continued his researches with the placentas of rabbits, guinea pigs, &c. In these animals he found that there is in their placentas a white substance formed by the epithelial or agglomerated glandular cells. He next ascertained that these cells, like those of the liver, were filled with glycogenic matter. The mass of glycogenic cells appeared to be situated between the maternal and fœtal portions of the placenta, and being developed, seemed to become atrophied as the growth of the fœtus proceeded. It was thus determined that the placenta in rabbits and guinea pigs is formed of two portions, having distinct functions—the one vascular, persisting till birth; the other secreting glycogenic matter, and having a more limited existence.

Returning then to his investigation on ruminants, M. Bernard discovered a remarkable disposition of the placenta which, not having been previously known, had been the cause of his former ill success in his earlier researches. He found in animals of this order, that whilst the vascular portion of the placenta accompanies the allantois, and is expanded over its external surface, the glandular portion is separated from the remainder, and is developed on the internal face of the allantois. This glandular portion secretes the glycogenic matter, whilst the liver is in an undeveloped condition; but as this organ becomes fit to assume its functions, the hepatic placenta (as it may be called) atrophies, and finally disappears.

The subject is still further discussed in relation to several important points, but we have only room for the conclusions which M. Bernard deduces from his investigations.

1st. There exists in the placenta of the mammalia a function which, till now, has remained unknown, and which coincides with the absence of the glycogenic function of the liver, during the earlier stages of embryonic existence. This function is localized in a transitory, glandular, or epithelial anatomical element of the placenta, which, in certain animals, is found mingled with the vascular portion of the organ; but which, in ruminants, is separated in such a manner as to form on the amnios a structure having the appearance of epithelium, and which, doubtless, has been frequently observed, but of which the physiological signification has not hitherto been perceived.

2d. This temporary hepatic organ of the placenta, in permitting us to study directly in an isolated anatomical element, the production of glycogenic matter, confirms and completes by a new example, that which I have said for a long time, that the formation of the amylaceous glycogenic matter is a faculty common to the animal and vegetable kingdoms. The observations contained in this memoir furnish us with yet further analogies, since we see the amylaceous glycogenic matter is accumulated around the embryo, and in its tissues, whilst in plants it is contained in the granules surrounding the vegetable embryo.

3d. We see, therefore, that with animals the glycogenic function commences with the life of the fœtus, and before the organ which performs this office in the adult is developed.

4th. All that we have said in this memoir relates only to the glycogenic function of the liver; but we should also seek to ascertain if the biliary function which the liver performs in the adult is not likewise accomplished by the placental hepatic organ which we have described. The question may be stated as follows: Do the same glandular cells perform both functions which, from that time become united, or, on the contrary, should not the liver be regarded as a complex organ, in which are found mingled two distinct sets of anatomical elements, the one designed for the secretion of amylaceous matter, the other for the formation of bile? This question, which has not yet been resolved by anatomists, notwithstanding the numerous works written upon the histology of the liver, appears to me capable of receiving much light, and even of being decided by physiological researches made, on the one part, on the embryonic development of the function, and on the other, on the inferior animals. I have undertaken investigations upon this subject, the results which will be communicated to the Academy as soon as they are terminated.

For the other memoirs we must refer our readers to the *Journal*, as we are unable at present to notice them more in detail. We would, however, call attention to the admirable paper of M. Robin, on the white corpuscle of the blood, which is worthy the careful perusal of physiologists. W. A. H.

ART. XXII.—*Diphtheritis: a concise Historical and Critical Essay on the late Epidemic Pseudo-Membranous Sore Throat of California* (1856–57), *with a few Remarks illustrating the Diagnosis, Pathology, and Treatment of the Disease.* By V. J. FOURGEAUD, M.D. Sacramento, 1858. 8vo. pp. 44.

Observations on Diphtheritis. By WILLOUGHBY F. WADE, B. A., M. B., T. C. D., Physician to the General Dispensary, etc. London, 1858. 8vo. pp. 32.

THE recent occurrence of extensive epidemics of diphtheritis in different portions of Europe and of the United States has directed anew the attention of physicians to the investigation of the pathology and therapeutics of this disease.

Diphtheritic or pseudo-membranous inflammation of the throat is believed by many writers to be a disease *sui generis*, differing essentially from croup, the severer forms of anginose scarlatina, and the so-called putrid sore throat; while there are others who contend that the affection of the throat in all these diseases is identical, differing only in respect to the amount of the membraniform exudation, its greater or less thickness and consistence, and its extension or non-extension into the larynx and trachea.

The first of these views is strongly advocated by Dr. Fourgeaud. He bases its support mainly upon the opinions and statements advanced by certain European physicians. By Dr. Wade, on the other hand, the correctness of views directly opposed to those advocated by the former gentleman are as earnestly insisted upon.

There exist, besides the above, other very important differences between the respective theories in regard to the disease entertained by these two gentlemen. Thus, according to Dr. Fourgeaud, diphtheritis is a strictly local affection, and one which, when properly treated in its early stages, is among the most manageable and least fatal of any which fall under the notice of the physician; while Dr. Wade, on the other hand, believes that a disease attacking, like diphtheritis, so many of the organs, either directly or indirectly, and in which the primary local mischief is so disproportionate to the subsequent danger, must be something more than "a simple throat disease," although it may ostensibly commence in that anatomical region; a disease, too, that he would class with the most terrible and fatal of those to which the human organism is liable.

The views thus advocated in the two publications before us, exclusive and contradictory as they would seem to be, may both be received as perfectly correct. A diphtheritic affection of the fauces may unquestionably prevail unattended by the symptoms of croup or scarlet fever, and without the presence of gangrene or putridity, properly speaking, of the throat; consequently, pseudo-membranous angina may with propriety be declared to be a disease distinct from croup, scarlatina, or putrid sore throat. Diphtheritis, it is very certain, may occur as a strictly local affection, readily controlled when correctly diagnosed in its early stage, and properly treated. It is not the less true, however, that the exudative inflammation, together with its pseudo-membranous product, is the same in all the cases in which it occurs; that the distinction that has been attempted to be set up between the diphtheritic deposit in pseudo-membranous angina, in scarlatina, and in croup, is not borne out by the result of close and accurate observation. It is a well-known fact that the extension of the diphtheritic deposit into the larynx and trachea, as sometimes takes place in cases of pseudo-membranous angina and scarlatina, gives rise to all the symptoms pathognomonic of idiopathic croup, and the same morbid condition of parts is discovered after death. The so-called diphtheritic inflammation we have already admitted may, in some cases, and even in entire epidemics, be a strictly local affection, and constitute the entire disease; but in general, and in all the more violent cases and epidemics, whether of scarlatina or pseudo-membranous angina, the affection of the throat would appear to be unquestionably the result of some general morbid condition of the system, most probably originating in and kept up by a diseased state of the blood. This, which constitutes the most unmanageable and fatal form of diphtheritic angina, may be the result of the poison of scarlet fever, or of some other morbific poison prevailing in the air under particular circumstances, of the nature of which we are as yet ignorant. The disease bearing in this respect, in many of its features, a close analogy to certain of the forms of epidemic erysipelas, in which the entire set of symptoms are due evidently to systemic causes.

To any one who will take the trouble to carefully examine all the facts bearing upon the question it will be evident, we think, that the disease described by Fothergill, Huxham, and other of the older writers, as putrid or gangrenous sore throat, was nothing more nor less than either cases of malignant scarlatina, or severe and protracted cases of diphtheritic angina, in which the patches of deposit in the throat becoming thick, dark, or ash-coloured, and occasionally softened and exhaling a fetid odour, have been evidently mistaken for gangrenous sloughs, which, when they separate, we are told, are quickly succeeded by others. An extent of sloughing, such as is described by some writers as taking place in putrid angina, could not possibly occur without causing bloodvessels to be opened, and a denuding or even destruction of the subjacent bony structures, but especially of such unresisting structures as the uvula, soft palate, and tonsils; a state of things, however, of which no mention is made in any of the descriptions furnished us of the most malignant epidemics of the so-called putrid sore throat.

In an account of diphtheritis as it prevailed in California, communicated by Dr. J. Blake to the session of the Medical Society of that State, held February, 1858,

although the opinion is advocated that the disease is of the zymotic class, and caused by some peculiar external influence which acts upon the entire system, yet its entire distinctness in its cause and nature, and, consequently, it its treatment also, from croup, scarlatina, and cynanche tonsillitis is insisted on. Its diagnosis from croup Dr. B. lays down in the words of Dr. Stokes, borrowed from his work on the diseases of the lungs and windpipe (Dublin, 1837); to which but slight objection can be made. The distinction, according to Dr. Blake, between diphtheritis and the exudation of the throat in scarlatina, is based mainly on the difference in the appearance of the exudation in the two cases, it being whiter and of a softer pultaceous consistence in scarlatina, and grayer and more tenaceous in diphtheritis. This asserted difference in the appearance of the exudation of the throat in diphtheritic angina, and in croup and scarlatina, is much insisted upon also by several of the English writers who have furnished us with accounts of the recent epidemic. We cannot conceive the propriety, however, of basing upon this fact alone, even though it should be finally established, so important a doctrine as that which teaches the independent and specific character of diphtheritis.

The essay of Dr. Fourgeaud is devoted rather to a consideration of the pathology of diphtheritis generally than to a history of the disease as it appeared in California during 1856–57; the conclusions of the writer being drawn from the facts and observations recorded by others. and adopted by him without any very close analysis, rather than from those which fell immediately under his own notice.

The observations of Dr. Wade contain merely an account of the symptomatology of diphtheritic angina, with an introductory chapter, comprising a brief though imperfect history of the disease, such points only being touched upon as seemed to the author necessary to a correct study of the subject. He purposes, in another publication, to further elucidate the disease by discussing the pathology and therapeutics of diphtheritis, upon which, as it seems to him, there prevails at present a great confusion of opinion.

The work of Dr. Wade is, of the two, the most erudite and strictly logical in its analysis of the views and observations that have been recorded by the leading writers in respect to the causes and nature of the disease of which it treats.

One of the most interesting features in the observations of the latter gentleman is his remarks upon the occurrence of albuminuria in cases of diphtheritis, a phenomenon which he assures us he certainly found to be very common in the fatal cases of the disease which occurred in Birmingham, and which he believes, judging from the descriptions given by former writers, was not less common in the disease as seen by them.

"The occurrence of hæmaturia at a late stage has," he remarks, "long been known; but it was supposed, and perhaps rightly, to indicate merely a purpuric condition of the blood, and to proceed probably from the mucous membrane of the urinary bladder. This opinion I held, in common I believe with every one else, till an opportunity was afforded me of examining the body of one dead of diphtheritis. I then found changes in the kidney, which will be more particularly described when we come to consider the morbid anatomy and pathology of the complaint, in consequence of which I made it a practice of more minutely examining the urine during life than I had previously done. This led to the discovery that albuminuria was not unfrequently present when there was no reason to suspect its existence from simple inspection of the water. That this differs materially from the hæmaturia above alluded to, appears from the absence of any other evidence of purpura, from the absolute absence of blood-corpuscles, as proved by microscopical examination, as well as by the colour of the urine, which may be neither red nor smoky. There are two circumstances which may lead us to suspect this complication, now that we are aware of its possibility—namely, a diminution in the quantity of the excretion, or the sudden disappearance of the lithate of ammonia." "At present, however, I can suggest no substitute for the careful examination of the urine at each visit, for there may never have been any deposit; and I am not sure that a slight increase in the *quantity* of the urine does not *sometimes* attend the earliest period of the kidney complication. It is sometimes very difficult in children to estimate accurately the quantity of urine passed, and if diarrhœa be present, impossible; and diarrhœa, I am disposed to

think, sometimes comes on at this epoch, and it is an important point for future observation to determine in what relation these two symptoms stand to each other.

"I had never met with any hint, either from authors on this subject, or from my professional friends, which indicated that they had discovered or suspected the existence of this most momentous complication; that it should have been so long overlooked is perhaps best accounted for by the apparently normal condition of the urine and the absence of dropsy, which I have *never* known to be present, nor have any authors, within my knowledge, alluded to dropsy as a symptom of diphtheritis. It is with great satisfaction that I am enabled to state that the correctness of my observation has been confirmed by many of my medical friends, since a fact of this kind, depending upon the veracity or capability of one observer only, is often received with much distrust."

"The specific gravity of such urine varies, as might have been expected; but I think it may be laid down pretty certainly that there is a diminution in the total amount of solid excreta, or, in other words, that the special functions of the kidneys are interrupted. Although this urine is often perfectly pellucid, and free from deposit, yet in some instances we find what I certainly should have been disposed to anticipate in all, viz., tube casts and renal epithelium. The tube casts may be of three forms, so far as I have at present observed, viz., firstly, what have been called 'small waxy casts;' secondly, casts of similar size, but granular, probably from commencing disintegration; and, thirdly, ordinary epithelial casts. Besides these objects, and perhaps even more common than they, are small masses of fibrin, of irregular shape, not moulded in the renal tubes; we generally find, also, epithelium from the bladder and other portions of the urinary passages. The tube casts and the granular epithelium often contain fat, in a state of subdivision, more or less minute."

In regard to the presence of albuminuria in certain cases of diphtheritis—and in no fatal case, since he has been aware of its existence, has Dr. W. failed to detect it—the question arises, Is it a necessarily fatal symptom? Which question Dr. W. answers by a decided negative; although present in all fatal cases, yet all cases in which its presence is ascertained are not therefore fatal. "The presence of albumen in the urine," he remarks, "is a common physical sign of a condition of the kidneys which interferes with their functional activity. I admit that in the present disease the quantity of albumen in the urine is generally—but, I again repeat, not necessarily—in direct proportion to the functional disability of the kidney, or, perhaps, even more accurately, to the retention within the body of those matters which should be excreted by the kidney; for we must not overlook the possibility of the renal offices being supplemented by other organs. This disability is to be estimated more perfectly by ascertaining the quantity of solids in the urine from a comparison of its quantity and specific gravity; a proceeding which, as I have before said, circumstances often render difficult. The best practical test is the vital one—the effects produced upon the other functions necessary to life, as learned from the symptoms which ensue. Proceeding in this way, we find that this complication may come on insidiously, not at once, and, indeed, sometimes not for weeks, reaching an extent which seriously affects the renal offices. Under such circumstances, all we can say of the cases is, that they seem, during its continuance, to be at a stand still: the throat mischief may be but limited, but it does not diminish; the vital depression may not be extreme, but it is persistent. In the only two really chronic cases that I have seen—one of which died at the end of five weeks, and the other did not begin to amend till nearly eight weeks after the first invasion—albuminuria was present, and they answered in every respect to the description which has been given by many authors of cases protracted for several weeks. It is worthy of notice that in the fatal case, which was not under my immediate observation, the albumen disappeared a day or two before death; I am not able to state whether this disappearance was coincident with any other improvement, or the reverse, in the physical condition of the urine. In the other case the disappearance of the albumen was concomitant with an increased excretion of urinary elements, and the first indications of returning health.

"When symptoms do arise contemporaneously with the kidney complication, they are those which have been universally described by writers as characteristic of that disease." D. F. C.

ART. XXIII.—*Anatomy, Descriptive and Surgical.* By HENRY GRAY, F. R. S., Lecturer on Anatomy at St. George's Hospital. The Drawings by H. V. Carter, M. D., late Demonstrator of Anatomy at St. George's Hospital. The Dissections jointly by the Author and Dr. Carter. London: Parker & Son, 1858. 8vo. pp. 750.

IT has often been with us a subject of regret that there existed no treatise in the English language in which the student could find the details of descriptive anatomy, combined, at the same time, with a concise account of the practical surgical relations of the various parts. It is true that we already possess many and valuable treatises both on descriptive and on topographical anatomy, but none, so far as we are aware, in which both regional and descriptive anatomy have been conjointly considered. The want of such a work has long been a void in the English literature of our science, and this void the book before us has been intended to fill. Whether or not the author has succeeded in his attempt, it will be for our readers to decide.

The very first glance at the volume upon our table tells us that it is one of a novel description—that it has been designed to address the eye of the student by the improved character of the illustrations, as well as to appeal to his intellect by the contents of the text. It is essentially a diagrammatic work, the value of which will be variously estimated by different readers. In the cuts, which are numerous and of large size, the old-fashioned system of numerations and foot-references has been discarded, and in its stead has been substituted the method —first, we believe, introduced by Mr. Holden—of printing in type the name of each anatomical part upon the representation of the object itself. The cut thus explains itself. It can be readily understood by the veriest tyro in anatomy, and loses entirely that semblance to an ingeniously contrived puzzle so often observable in some even of our best anatomical delineations. For ourselves, we must freely admit that, in our judgment, the mode of illustration adopted in the present volume cannot but present many advantages to the student of anatomy. To the zealous disciple of Vesalius, earnestly desirous of real improvement, the book will certainly be of immense value; but, at the same time, we must also confess that to those simply desirous of "cramming" it will be an undoubted godsend.

The peculiar value of Mr. Gray's mode of illustration is nowhere more markedly evident than in the chapter on osteology, and especially in those portions which treat of the bones of the head and of their development. The study of these parts is thus made one of comparative ease, if not of positive pleasure; and those bugbears of the student, the temporal and sphenoid bones, are shorn of half their terrors.

The chapters upon the ligamentous system, and the joints generally, structures so all-important, and, we fear, so often neglected by the student, are clearly written, and the accompanying cuts are such as to warrant our highest approbation. We would draw the attention of our readers particularly to the representations of the occipito-atloid and the atlo-axoid ligaments. A comparison of these cuts with the appearances presented by the drawings of similar parts in any of our other standard books on anatomy—Sharpey and Quain, or Wilson, for example —will at once evince the great superiority (in illustration, at least) of the work before us.

A feature in Mr. Gray's book, which ought not to be passed unnoticed, is the manifest desire of the author to extend the scope of the usefulness of his book. It is not intended only as a work of reference for the practitioner, or a volume to be studied by the student in his preceptor's office, but it is designed at the same time to serve and assist the student of anatomy in his labours in the dissecting-room. For this purpose the most minute directions are laid down relative to the manner of making a dissection; the position in which the subject is to be placed, the direction of the external incisions, and the proper order in which the tissues are to be varied, are all topics which are not considered beneath the dignity of our writer's pen. Nor are they; for although by some these matters may be

looked upon as trifling, yet by those who have so often witnessed the first blundering attempts and marring efforts of the youthful anatomist, any endeavour to obviate his difficulties will be thoroughly appreciated.

Another feature which strikes us in turning over the pages of the volume is the satisfactory order and arrangement in which adjacent parts are considered. We are not obliged, for example, when examining the anatomy of the muscles of the neck, to turn to another portion of the volume to find a description of the deep fascia of the same region. The requisite explanation is introduced in the proper locality, and in its natural order—that is, immediately after the paragraph in which the platysma myoid is described. By this method of presenting conjointly the description of the muscles and fasciæ a much more full and complete idea of the anatomy of a part in question is conveyed to the mind of the student. At the same time, a chapter on "Fasciæ," in most works dry and often obscure, is dispensed with.

We will not occupy the time of our readers by entering into any analysis of the chapters devoted to the familiar subject of myology. Of course we can look for nothing new; but we would merely remark, in passing, that at page 213 we are presented with a most satisfactory exposition of the muscles of the palate, accompanied by an illustration of which the student has long stood in need. We refer to a view of the pharynx, as laid open from behind, exhibiting the muscular structure, and the position of the tonsils. A great merit in this cut consists in its distinctness, affording, as it does, an admirable idea of the locality of the parts involved in Mr. Ferguson's procedure for the division of the levator-palati and palato-pharyngæi muscles in the operation of staphyloraphy. Believing, as we do, that the improvement suggested by this excellent surgeon is one which materially affects the success of any operation for cleft palate, we consider that the anatomy of this region deserves the most attentive study.

Following out the design expressed in the preface of the book, the author is constantly in the habit of introducing remarks tending to impress upon the student the necessity of applying his anatomical knowledge to the more practical and every-day points of surgery. To this end, at the termination of the description of the muscles of each extremity we are furnished with a chapter on the surgical anatomy of the part, and the student is desired to consider the effect likely to be produced by the action of the muscles in each particular fracture. These displacements are illustrated by diagrams, somewhat after the manner of Hinds's plates, and the general indications in the cure of each fracture are pointed out. The mode of treatment enforced by the author is mostly the application of the routine English apparatus, much of which has been long, and, we think, properly, discarded in this country.

The chapters upon the arterial system form one of the most prominent portions of Mr. Gray's book, and it is upon this section that the author has endeavoured to impress most strongly a practical character. Not only are the normal distributions of the arterial branches pointed out, but, at the same time, their most frequent variations. The author has also followed the description of each main trunk by a paragraph containing the standard formulæ for its ligation. We are glad to observe the stress which is laid upon the importance of regional anatomy, and the necessity of following out, during operations, the rule which has been so well characterized by Malgaigne as "the rule of the guiding points." The value of Mr. Gray's remarks on these subjects will be better understood if reference be made to the articles upon the carotid and subclavian arteries, and the anatomy of the triangles of the neck, or to his remarks upon the ligatures of the femoral or axillary arteries.

The venous system is one, also, in which the author has evinced care in description, more especially with reference to the position of the valves, a matter often almost ignored even in standard treatises on anatomy. We notice at pages 401 and 421 that single valves have been assigned to the terminations of the spermatic veins in the male, and to their analogues, the ovarian veins, in the female. This is a point to which, on a previous occasion, we have drawn the attention of anatomists, and we are glad to see the fact of the existence of the right spermatic valve in either sex now corroborated. At the same time, we do not agree with Mr. Gray as to the existence of a perfect valve at the termination of the left

spermatic vein in the left renal vein. Here our experience has demonstrated merely the presence of a triangular fold of the lining membrane of the vein, sufficient to influence the direction of the current from below upwards, but not sufficient to prevent regurgitation, as is done by the valve of the opposite side. These facts can be readily proven by an injection thrown into the primitive iliac vein so as to pass upwards into the vena cava.

The description of the brain and nervous system occupies about one hundred pages of the volume before us, and is well illustrated, the cuts of the fifth and eighth pair of nerves being particularly commendable.

The organs of the special senses also come in for a fair share of our author's attention, and the cut illustrating the position of the salivary apparatus is such as cannot fail to furnish the student an idea of the anatomy of parts of which he rarely obtains an accurate impression from his early dissections.

At page 649 we observe an omission, to which we draw attention, since it is a matter which generally escapes attention. We allude to the position of the bronchial septum of the trachea. The existence of this spur or ridge, and its influence upon a foreign body in the trachea passing towards the bronchial tubes, was first, we believe, pointed out by Mr. Goodall, of Dublin, and has since been most strongly insisted upon by Dr. Gross, in his valuable work upon foreign bodies in the air-passages. Frequent opportunities of observation have convinced us of the correctness of the assertion as to the existence of such a septum.

Our space will not permit us to enter into a further analysis of Mr. Gray's book, nor to notice, as we had intended, the chapters upon herniæ and the perineal region, which are replete with valuable surgical information. We have said enough, however, to furnish the reader with a general impression concerning the volume to which his attention has been directed. It is, in our estimation, an admirable and complete text-book for the student, and a useful work of reference for the practitioner; its pictorial character forming a novel element, to which we have already sufficiently alluded. Before taking leave of the volume, we would remark, in justice to one of the gentlemen engaged in its production, that although the text is from the pen of Mr. Gray, the illustrations are from the pencil of Dr. Carter, so that, in bestowing our meed of praise upon the book, we must remember that not a little credit must be referred to the gentleman last mentioned.

The press-work of the book evinces some carelessness, and frequent misprints and omissions betoken a hasty proof-reading; but these we have forborne to notice, regarding them, to a certain degree, although not altogether, as inseparable from the appearance of a first edition, and which, we doubt not, will be corrected hereafter.

In concluding our brief notice of this really excellent treatise, we would state that an opportunity has been afforded us of examining some of the proof-sheets of the American edition, to be issued shortly, which, as far as we have seen, fully equals the English copy in beauty of execution, while the typographical errors which had crept into the latter are corrected, and the index is greatly improved in its arrangement.

J. H. B.

ART. XXIV.—*On Infantile Mortality, and the Establishment of Hospitals for Sick Children.* Read before the Dublin Obstetrical Society, January 8th, 1859. By WILLIAM MOORE, A. B., M. B., Trin. Coll., Dublin, M. R. I. A., Physician to the Hospital for the Diseases of Children, etc. Dublin, 1859.

IF the words quoted by Dr. Moore from the British and Foreign Medico-Chirurgical review, as a motto for his Essay, convey truths applicable to Great Britain, they do so to even a greater extent in reference to this country. Most certain it is that "the knowledge of our sanitary condition as a people is still most indefinite, and that still less defined is our knowledge of the measures best adapted to correct the causes of disease and death, which are daily and hourly

diminishing the efficiency, as well as curtailing the lives of our men, women, and children." It is only, however, so far as the correctness of this statement has reference to the infantile portion of the community that it concerns us on the present occasion.

The appalling waste of life which takes place during the first five years of existence, both in Europe and America, is a subject that demands the serious consideration of every thinking mind and feeling heart. The physician, especially, is called to the investigation of its causes, and of the means for its prevention, not simply in furtherance of the common interests of humanity, but from the intimate connection the subject has with an interesting branch of public and private hygiene.

The condition of the infantile portion of a population in respect to freedom from, or proneness to disease—in other words, the greater or less extent of the mortality that occurs during the first few years subsequent to birth—is, to a very great extent, the correct exponent of the general sanitary condition of that population, and of the wisdom or folly of its social arrangements and domestic economy.

"The places where the mortality among young children is the most rife are, of necessity, places where the survivors are apt to be sickly; and if they fight through a scrofulous childhood, to realize a stunted puberty, they become the parents of a still more unhealthy offspring than themselves, and less capable of mental and physical exertion. It cannot be too widely disseminated, says Mr. Simon, 'that a high local infantile mortality must necessarily indicate a high local prevalence of those causes which determine a degeneration of race.'"

In the Essay before us, Dr. Moore has presented some interesting statistics, showing the mortality of infants in the Kingdom of Great Britian. From these we learn the startling fact that, in England, nearly 26 per cent. of all born perish before the end of the fifth year; and that, in London, before the attainment of the tenth year, 35 per cent. perish. In Scotland, the mortality under five years of age, with reference to the general mortality, constitutes an average of 40 per cent.; and in Liverpool, at the same early age, a generation is nearly half exhausted. Of all born among the better classes, it has been ascertained that from 25 to 30 per cent. perish under ten years of age; 30 to 40 per cent. amongst the lower classes; and under epidemic influences, or other unfavourable circumstances, from 60 to 70 per cent. perish in the same limit of years. Of 14,450 boys existing under five years of age, 2,087 died, in Liverpool, in a single year; of 14,045 boys in the rural parts of the county of Surrey, only 699 died in the same lapse of time."

"Of 100,000 children living, under one year of age, not of the poorer classes only, nor of the sick only, nor exclusively in cities, but throughout England, and under all the ordinary conditions of life, it is believed that 17,355, or 1 in 6, die within the year. To parallel this proportion of mortality, we must pass from what should be the day spring of life to the age of decrepitude, and we find it first reached a second time between the 80th and 85th years of existence. Again, of 100,000 living under five years of age, 6,349, or 1 in 16, die within the year; a mortality which is not again attained till from the 70th to the 75th year. Of a like number, between the ages of 10 and 15 years, only 527, or 1 in 190, die; and between 30 and 45 years of age, 1143, or 1 in 88, die; of 100,000 living of all ages united, from the new born to the centenarian, 2,160, or 1 in 46, is the sum of the annual mortality. The average annual mortality of the nursling is, therefore, about 32 times, and that of the child up to 5 years of age about 12 times, that of the vigour of youthhood, and 5½ times that of the manly prime, or the one is about 8 times, and the other 3 times, that of the gross or general average of human existence."

In eight of the principal towns of Scotland, 46.5 of all children die under five years of age, namely: in Dundee, 55.1; in Glasgow, 52.90; in Leith, 47.5; in Greenock, 46.80; in Paisley, 46.7; in Edinburgh, 41.8; in Aberdeen, 35.50; and in Perth, 32. In the whole of Ireland, 18 per cent. of the children die before they attain their fifth year; In Drogheda town, 25.5; in the city of Cork, 23.5; in county Kerry, 22.9; in Belfast, 22.7; in the city of Waterford, 22.5; in the city of Limerick, 22.1; in the city of Kilkenny, 20.3; in Dublin, 20.2; in Gal-

way town, 20; and in the counties of Down, Monaghan, Queens, and Kildare, 14.4 to 14.9.

The chief causes productive of this waste of life in early infancy are, without doubt, those pointed out in a report on this subject, made to the American Medical Association: a defect of vitality at birth, transmitted to the child from one or both its parents; the mismanagement of infancy by parents, nurses, and quacks, in respect to feeding, dress, cleanliness, with the unnecessary administration of drugs, as purgatives, carminatives, vermifuges, calmners, purifiers, and strengtheners; and, finally, deficient light, air, ventilation, clothing, fuel, and wholesome food—deficiencies incidental to cities as compared with country towns and rural districts. To these causes may, perhaps, be added misconceptions or entire ignorance on the part of the mass of medical practitioners in regard to the true pathology and therapeutic treatment of many of the maladies incident to the periods of infancy and childhood.

"The extraordinary mortality among children in Australia," Dr. Moore remarks, "is one of the most painful phenomena of the present day. Of all inhabitants of the temperate zone, the return of the genial spring and summer brings to them not rejoicing but woe. The season which nature indicates as the time for the renewal of animal and vegetable life, becomes with them the season of death. It is hardly credible, if it was not for the accuracy of their statistical tables, that in Melbourne, during the summer months, the natural increase of population is actually checked, and that the number of births scarcely exceeds the number of deaths. For the months of December, January, and February last, the difference of births over deaths has been only *twenty-four*. There can be no stronger proof of the anomalous and temporary character of the social condition of this colony two or three years ago, or of its subsequent sanitary progress, steady, indeed, but presenting lamentable results, than a glance at the tables of births and deaths. For six months of 1853, the deaths exceeded the births in the proportion of 2 to 1; in 1854, the proportion was reduced to less than 3 to 2; in 1855, the births predominated as 21 to 17. This improvement continued in 1856; until in 1857, we had only 70 deaths for 100 births. These figures prove rather the astonishing degradation of their previous sanitary condition than the merit of their present social state. In the fourth year of progressive improvement, the mortality is still greater than that which is recorded in the deadliest plagues. In a delightful climate, amid abundance of wealth, the children die more quickly, and in greater numbers, than in a land of pestilence and famine. Nor is this all; we know the wonderful renovating powers of nature; we know how soon, after a population has been decimated by any of the great scourges of our kind, it soon recovers its former numbers and its natural tone. But in the present case, it is the very source of supply that is threatened; it is the children—the men and women of the next generation—that disappear with such terrible rapidity."

From Dr. Greenhow's recent valuable work on the sanitary condition of the people of England, as quoted in the Essay before us, we learn that croup, usually considered more fatal in damp districts, and by the side of rivers and marshes, is not so in fact; Lincolnshire and the fenny districts of England presenting a lower mortality from this disease than the northwestern or Welsh counties. Dr. Greenhow's statistics go to prove, also, that males suffer more from croup than females.

In the same work it is shown that the mortuary statistics of the infantile population would seem to be marked by an absence of any uniform relation "between the proportion of deaths from all causes and from particular diseases." Males die from nervous diseases in a much larger proportion than females. The male rate for England being taken at 100, the female at 75; in some places it is as low as 67 or 68; in others, as New Castle-on-Tyne, it is as high as 91.

Some curious facts in reference to the nervous diseases of children are revealed by the report of Dr. Greenhow. Thus, for every hundred of the males of Liverpool that die from these diseases, more than one hundred and forty perish in Carnarvon. Convulsions cause more deaths in England and Wales, generally, than either fevers or bowel complaints, and almost as many as scarlatina, measles, smallpox, and hooping-cough put together; though the sphere of convulsions is

confined, in this calculation, to children under five years of age. The great anomaly, however, is in the town of Carnarvon. This is apparently a well situated and healthy town. Its general health being shown by statistics to be somewhat better, upon the whole, than that of England and Wales. And yet, in respect to the convulsive or nervous diseases of children, the returns from this town are most astonishing. Out of 1,000 deaths in each sex, this cause of death stands: in London, for 76 males and 61 females; in the northwestern counties, for 128 males, 106 females; in Yorkshire, for 148 males, 121 females; in Manchester, for 130 males, 107 females; in Liverpool, for 99 males, 85 females; but in Carnarvon, for 240 males and 220 females. Why children should die in Carnarvon of hydrocephalus, convulsions, and teething, at such a rate, appears to Dr. Moore truly an enigma.

"The maladies in question," he remarks, "are found usually more fatal in manufacturing than in agricultural districts—a circumstance very intelligible. Carnarvon is neither a densely populated, nor a high pressure manufacturing town; and even if its atmosphere should be otherwise than salubrious, which I should not think it was, it is hard to imagine any condition of climate which would necessarily throw children into fits. Dr. Greenhow tries to explain this anomalous mortality by the theory of race; and as he thinks that, Monmouthshire, and the Welsh counties generally, presenting rather a high mortality in other disorders of a character analogous to this, possibly Celtic blood may have something to do with the matter. The conjecture is an ingenious one, and, considering the known temperament of the Welsh, even plausible; but, unfortunately, it is completely upset by the fact that the two counties where the mortality under this head is lowest, happen to be peopled from a Celtic stock also, viz: Cornwall and Cumberland. This, however, though so striking an anomaly, is only one out of the many supplied by the statistics before us, and for the solution of which all the patience and acuteness of sanitary philosophers will be required."

Dr. W. Williams doubts the correctness of the returns from Carnarvon, the term convulsions being used with a very loose acceptation, in reference to the diseases of children by the apothecaries and irregular practitioners of that town. A gentleman conversant with the social condition of the people of Carnarvon, and of Wales generally, explains the excessive mortality from affections of the head in children, from the fact that the mothers in Carnarvon, in order that they may be enabled to pursue, with as little interruption as possible, their several avocations, are in the habit of giving their children *opiates*, made up in sweetmeats and similar palatable forms. Within the last few years, cases of infanticide, growing out of this practice, have been greatly on the increase in the town.

The nervous diseases of infants furnish striking evidence of the mischief inflicted by unfavourable kinds of labour. The fatality from these diseases is, therefore, as might be anticipated, very variable in different districts.

"In Buckinghamshire, Cumberland, and Herefordshire, these diseases do not cause one death for every 1000 of the population. In the West Riding of Yorkshire, they are three times as fatal. The '*prima origo mali*' is traced to factory labour. Parents living in a vitiated, noxious atmosphere, become feeble and anæmic; the offspring partakes of the same weakly state of constitution, and is early carried off by disease. The fatality does not prove the entire mischief—for wherever a profuse infantile mortality prevails, the remaining children are inferior to the average, which beget a deteriorated race. This is a point of more moment, and of more pressing interest, than even the endeavour to stem the mortality, the result of epidemic disease, in the prime of life.

"Under acute non-infectious diseases, Mr. Simon includes convulsive or nervous diseases, diarrhœa, and respiratory inflammations, as regards their endemic prevalence among young children. These diseases are peculiarly obnoxious to large manufacturing towns and districts. We all must admit that sudden vicissitudes of temperature induce pulmonary and bronchial diseases generally, and that improper food produces diarrhœa. But Mr. Simon naturally inquires, 'why should the death rates vary as they do in different districts of the country? Thus, the death rates in three of the healthiest country districts of England from these diseases are 925; in the unhealthiest district it is 6895! Why are non-infectious infantile diseases seven times as fatal in one district as

in another?' In reply to this question, he considers the complaints separately: 1st, nervous disorders of early life killed in nine years, from 1848 to 1856, 330,881 young persons, or 37,000 annually. The average mortality is 2½ times as high throughout the northwestern counties as throughout the eastern, south-eastern, and south-midland districts. Two thirds of these deaths are registered as by convulsions. The foul and vitiated state of the atmosphere has been the assigned cause of this evil; the mortality in the Dublin Lying-in Hospital having been wonderfully reduced by more efficient ventilation of the wards. 2. The death rate among infants from non-tubercular diseases, almost exclusively inflammations of the respiratory organs, is very large, 28,763 infants having died of pneumonia, bronchitis, and croup, in 1856. The diseases seem also attributable, in a great measure, to the inhalation of impure air; the children who are freely exposed to the air in rural districts being comparatively exempt, whilst those who are 'cooped up' in close rooms, as in towns, readily fall victims to such poisonous influences. 3. Diarrhœa and dysentery annually extinguish the lives of more than 11,000 infants under five years of age—the causes of these diseases are to be found in bad food, deficient sewerage and ventilation; here, also, the death rates vary from 76 to 1779. The gross mortality among young children is referred by Mr. Simon to the varying prevalence of two local causes—1st. To difference of degree in common sanitary defects of residence. 2dly. To occupational differences amongst the inhabitants, there being certain large towns where the homes are badly kept, and the children but little looked after. The varying mortality from smallpox in the different towns in England shows that vaccination is not yet very satisfactorily carried out. In Eaststonehouse, we find the deaths in 100,000 from this pestilence number 146; in Plymouth 134; Penzance 105; while in Birmingham and Manchester, the numbers are only 37 and 26 respectively in 100,000. Thus we find the mortality from this source four times as great in one town as in another. To foreign countries who have learned vaccination from us, it must seem anomalous that we still lose four or five thousand annually by this disease; and a recent report of the Registrar-General shows a curious illustration of slow social progress, that in certain districts in England, during the three months ending 31st March, 1858, sixty years after Jenner's discovery, deaths from smallpox amounted to a fourth part of the entire district."

In view of the very great liability of infants and young children to disease—the causes to which this liability is mainly attributable—and the frightful amount of mortality incident to the earlier ages of existence, the question of prevention is one within the province of an enlightened hygiene, public, domestic, and personal. A special question, however, of some importance presents itself in reference to the influence that may be exercised by the establishment of hospitals, especially appropriated to the treatment of the diseases of children, in the prevention of some portion of the excessive mortality produced by these diseases.

Of the very great value of well-constructed, properly located, and correctly managed hospitals for children, we believe that scarcely any difference of opinion will be found to exist. That they are calculated to save many lives, which without them would most certainly be lost, we have incontestable evidence. But, it may be asked, may not the maladies of children be equally well treated in the wards of a general hospital as in one devoted to them especially? To this question, experience has proved that the reply must be in the negative. The treatment of the diseases of children in the same institutions into which adult patients are also admitted, has often been tried, but has been found invariably to be attended with serious inconvenience. The special requirements and attention demanded for the proper and successful management of the maladies of young children, would seem to be altogether incompatible with the arrangements, duties, and working of a large general hospital. "Such," at least, as Dr. Moore remarks, "is the experience of physicians of eminence in London and elsewhere, where such a combined system has been attempted."

"In default of internal accommodation for sick children in the wards of a special hospital, the next step in a right direction has been the establishment of dispensaries for their special extern treatment. These institutions, at best

imperfect, at the same time conduce very materially to the alleviation of disease, particularly in the infantile stage, as well as a means of affording to students an opportunity of acquiring a practical acquaintance with diseases of early life, and also of affording instruction to mothers and nurses, as regards well-directed hygienic requirements. Of course the deficiencies of such instructions are self-evident, viz., in alleviating those maladies for which the surveillance of the physician, and careful tending of experienced nurses, are so indispensable, and also of affording that intimate knowledge of the nature and treatment of children's diseases, which can only be acquired at the bedside of the patient—information which must react beneficially on all grades of society."

Among the objections to the treatment of the diseases of children in the dwellings of the poor and improvident classes, are to be ranked, not only the general want of proper accommodations and attendance, and the difficulty there is always experienced of enforcing an appropriate diet and regimen, but the important fact that the little patient, while he continues an inmate of his parents' domicile, continues, in very many cases, to be there subjected to the same morbid influences which, in fact, produced the disease under which he labours—dampness, filth, undue cold or heat, and a foul and stagnant atmosphere. Without a removal of the patient from out these deleterious agencies, it can scarcely be expected that even the best directed treatment will be successful in the arrest of the fatal progress of his case.

Dr. Moore furnishes us with statistics which show very clearly the advantages of children's hospitals—when well planned, well located, well constructed, and well conducted—by the greatly diminished mortality among the patients treated in their wards, compared with that which occurs among sick children when treated in the homes of their parents.

"We have already seen," he remarks, "that the mortality of children in London, up to their tenth year, is about 35 per cent., and the mortality in the Children's Hospital averages 14 per cent. This, though not a very low mortality, yet is a very favourable contrast. In Manchester, where the computation is, that 55 per cent. of children die before they reach the age of five years, the mortality, according to the last report of the Children's Hospital, was at the rate of 13¾ per cent. But looking at the returns of the continental institutions, we find that in Vienna, taking a mean average of eighteen years, the deaths of children of all classes amount to 60 per cent., and the average mortality of the Children's Hospital about 24½ per cent., these percentages are appallingly high; even the mortality in the adult hospitals in Vienna ranges as high as 14 per cent., equal to that of the London Children's Hospital. Over all Austria the computation is, that 26 per cent. of children born die in their first year, and 37 per cent. within the first four years.

"In Paris, in 1820, 1441, or nearly 33 per cent., perished in the first two years of infancy; in the fifteen years previous to 1831, the average deaths of all children born were upwards of 18 per cent. within the first year, and 28 per cent. before the completion of the fourth year of existence. For a long average of years 19¼ per cent. has been the average mortality in the great hospital for sick children in Paris.

"Casper, the eminent statistician, has informed us that in Berlin, in an average of forty years, up to 1822, of all children born there, 52 per cent. died in the first year; while during the war, in the early part of the present century, 71 per cent. perished. An average of years shows that the mortality of the Hospital for Sick Children in Berlin was only about 11 per cent.

"Of 1066 children, under seven years of age, in the hospital at Milan in 1855, the deaths were 168, or 15.76 per cent.; of youths from eight to fifteen years, 2095 were treated, and the deaths were 154, 7.35 per cent." D. F. C.

ART. XXV.—*On Gastro-Colic Fistula. A Collection of Cases and Observations on its Pathology, Diagnosis, etc.* By CHARLES MURCHISON, M. D., M. R. C. P., Assistant Physician to King's College Hospital, London, and to the London Fever Hospital, etc. etc. Printed from the Edinburgh Medical Journal for July and August, 1857. Edinburgh, 1858. 8vo. pp. 36.

IN this most interesting essay, Dr. Murchison has, with great industry, brought together and carefully collated all the facts to be found upon record, and derivable from every other accessible source, in respect to gastro-colic fistula, with the view of deducing some general conclusions as to its causes, character, symptoms and results.

With the exception of such of the intestinal fistulæ as occur in the neighbourhood of the anal orifice, the morbid communications which are liable to be formed between different portions of the digestive canal, between it and some one or other of the natural cavities or with the external surface, have received comparatively little attention on the part of medical observers. Though not of very frequent occurrence, still there is not any portion of the digestive canal from the mouth to the anus, in which such fistulous communications may not take place. Some in situations and under circumstances which render their presence sufficiently evident at first sight, while the existence of others is to be detected only by the occurrence in the patient of a certain concourse of symptoms—and even these symptoms are liable to mislead, inasmuch as they are not singly nor collectively restricted to intestinal fistulæ, but are liable to be induced by other and very dissimilar causes.

After noticing the several supra and infra diaphragmatic intestinal fistulæ liable to take place, with a reference to the cases of such found upon record, Dr. M. takes up the subject of gastro-colic fistula, or that between the stomach and transverse arch of the colon—the histories of thirty-three cases of which he has found recorded by various writers, or have been communicated to him by professional friends. The conclusions which he believes may be legitimately drawn from these cases, in regard to the pathology, diagnosis, and prognosis of the fistula in question may be thus briefly stated:—

1. As to the *mode of origin* of gastro-colic fistula, it would seem to be in the great majority of cases one of the sequelæ of simple or cancerous ulceration of the stomach. Thus out of the thirty-three cases collected by the author, *twenty-one* were from cancer, and *nine or ten*, probably, from simple ulceration.

This greater rarity of gastro-colic fistula as a consequence of simple ulcer, it is supposed by Dr. M. may depend on three causes, viz.: the fact that simple ulcer is much more rarely met with in that part of the stomach nearest the colon—the great curvature—and that there is a greater tendency in cancer to contract adhesions to neighbouring parts before perforation, while, at the same time, the cementing matter is of a less permanent quality than the lymph thrown out in the vicinity of a simple ulcer.

It is possible that the cancerous and simple ulcer productive of gastro-colic fistula may not always commence in the stomach but occasionally in the colon.

In two cases Dr. M. is of opinion that the lesion was produced by an abscess of the abdominal cavity, bursting into both the stomach and bowels. He considers it also probable that a gastro-colic fistula may result from the softening of tubercular matter cementing together the stomach and colon, in the same way as a fistula may be sometimes formed between the œsophagus and one of the bronchi.

In eighteen of the thirty-three cases of gastro-colic fistula collected by Dr. M. the stomach and colon are noted as intimately adherent; in seven the closeness of adhesion is doubtful; but in eight cases mention is made of a cavity of greater or less extent existing between the two. In three of these eight cases the cavity appears to have been hollowed out of a cancerous mass, that possibly had its origin external to both stomach and colon—in the retroperitoneal glands. In one case the intervening cavity was a scrofulous abscess. In one case the

original disease was a simple ulcer of the stomach, this opened into the lesser sac of the peritoneum, producing a limited abscess, which ultimately burst into the colon; in a similar manner, in another case, ulceration of the colon probably gave rise to the formation of the cavity. In one case the cavity was the pelvis of the kidney, and in another an abdominal abscess.

In three of the cases, besides the opening between the stomach and colon, there also passed from this cavity a fistulous opening through the abdominal parietes. In one case this opening seems to have existed previously to the opening into the colon.

Out of twenty-five cases in which the situation of the opening was noted, in eleven it was at or near the pylorus; in ten in the great curvature; and in four at or near the fundus. In two of the cases, in which the opening was situated in the great curvature, there was also ulceration in the neighbourhood of the pylorus, so that the cases in which the pylorus may be said to have been free from disease, were twelve in number.

The size of the opening in the stomach varied, in different cases, from half an inch to several inches in diameter. In one case, although the opening in the stomach was large, that in the colon merely admitted a crow quill. In three cases the opening was divided into two by a slip of mucous membrane; and, in one of these cases, in such a way that each segment of the colon corresponded to one of the divisions, so that the only communication between the two segments was through the stomach.

In four cases the stomach is noted as small and contracted; and in two, the small intestines as contracted or empty, as also in one the ascending colon; at the same time, in four of the cases the descending colon is described as dilated, or containing feces. In one case the cæcum and ascending colon were much distended, but in this instance there was a stricture of the arch, immediately to the left of the fistula.

The symptoms and diagnosis of gastro-colic fistula will be readily understood from the following general propositions, as given by Dr. M.

"1. We have, in the first place, almost invariably, the symptoms of either cancer or perforating ulcer of the stomach for a greater or less period.

"2. Then we have symptoms, more or less marked, indicating the formation of the opening"—[Pain, diarrhœa, sickness, urgent vomiting, a sensation of something having burst in the belly, irregular intermittent pulse, rigors, great prostration, etc., all or some of which may be present, but not in every case].

"3. When the opening is fairly established, there is very generally vomiting of feces.

"4. Fecal vomiting, supervening upon the symptoms of cancer or perforating ulcer of the stomach, would render the diagnosis tolerably certain.

"5. Where fecal vomiting is absent, there will be the greater probability of our finding lienteria, and this, with the other symptoms and signs enumerated, would in general leave little doubt as to the nature of the case.

"6. When there is lienteria, without fecal vomiting, there will probably be found disease of, or near to, the pylorus, or a very large fistulous communication.

"7. In a case with neither lienteria nor fecal vomiting (which probably will never occur, except the communicating aperture be very small), it is unlikely that the lesion would be suspected; but even then its existence might be guessed from observing a greatly increased rapidity of emaciation, and a relief from previously existing pain, combined with the results to be derived from coloured enemata and percussion." [The former, in cases of gastro-colic fistula, enter the stomach and are vomited; the latter, in many cases, yields a tympanitic sound.]

The prognosis, in all cases of gastro-colic fistula, is unfavourable. Nevertheless, patients may live for a considerable period after the formation of the fistula. In eleven of the recorded cases, the patients lived 1½, 6, 10, 21, and 48 days, 2, 3, 6, and 7 months, and one 2¼ years. In this last case, the patient went about, and followed his occupation as a clerk, until within three months of his death. In this case the pyloric opening was free. Pyloric obstruction with great lienteria always renders the prognosis more unfavourable. D. F. C.

ART. XXVI.—*Woman: Her Diseases and Remedies. A Series of Letters to his Class.* By CHARLES D. MEIGS, M. D., Professor of Midwifery and the Diseases of Woman in the Jefferson Medical College at Philadelphia, etc. etc. Fourth edition, revised and enlarged. Blanchard & Lea: Philadelphia, 1859. 8vo. pp. 706.

IN this fourth edition of a most popular work, the author professes to have introduced many things formerly omitted, and erased others that he considered no longer needful to remain, while he has "endeavoured so to improve the style and recast many portions of the work as to make it more useful and more pleasing to the reader."

Whatever estimate may be placed upon the pathological views entertained by Dr. Meigs in respect to certain of the maladies incident to the female sex, or upon the method of cure laid down by him for some few of these maladies, and whatever exceptions may be taken to the style in which his teachings are couched, the work before us, taking it as a whole, must nevertheless be received as one of sterling merit—well adapted to communicate clear views of the causes, and nature, and management of the maladies of which it treats, and in a manner to impress these views with distinctness upon the mind and memory of the reader.

The leading characteristics of Dr. Meigs' medical writings are their originality—their clearness, and the earnest, positive, and somewhat quaint style in which they are composed. These characteristics are very prominently evinced in the volume before us. Dr. Meigs is, perhaps, more tenacious than almost any other contemporary medical author of equal eminence in a strict adherence to the opinions he has once uttered, the practical precepts he has once emitted, and even the modes of expression he has once adopted, however much their correctness may be controverted and disproved, yet in each new edition of the work under notice we find throughout substantial improvements, bringing the author's teachings in closer approximation with the progress of medical observations and discoveries, and ridding his language of some of the peculiarities which marred its beauty without adding in any degree to its force. D. F. C.

ART. XXVII.—*Elements of Medicine: A Compendious View of Pathology and Therapeutics; or the History and Treatment of Diseases.* By SAMUEL HENRY DICKSON, M. D., LL. D., Professor of the Practice of Physic in Jefferson Medical College, Philadelphia, etc. etc. Second edition, revised. Blanchard & Lea: Philadelphia, 1859. 8vo. pp. 760.

IN this second edition of the very admirable compendium of Dr. Dickson, while the general features and plan of the first edition remain intact—while the same clear and sensible views of the nature, and phenomena, and treatment of disease are taught, and in the same luminous and beautiful style, almost every portion of the work evinces the care which has been exercised by the author in its thorough revision, with the view to the correction of errors and the supplying of deficiencies.

Although restricted to the elements of medicine—professing to present simply a compendious view of the history and management of diseases—the practitioner and student will find it to be both a useful and safe guide to a knowledge of the leading outlines of the principles and practice of the healing art.

Its careful study cannot fail to lay an excellent foundation for the more extended investigation of pathology and therapeutics. In every point of view the work of Dr. Dickson commends itself to those for whose use it was primarily and mainly prepared—to such as have engaged in the study of medicine—to physicians who have recently assumed the responsibilities of practice, and, finally, to public and private medical instructors, to facilitate these in their task of communicating to their pupils that knowledge they are earnestly seeking to acquire.

D. F. C.

Art. XXVIII.—*On the Frequency, Importance and Treatment of Ulcerations of the Os and Cervix Uteri.* By D. McRuer, M. D. Bangor, Maine, 1859. 8vo. pp. 46.

In this pamphlet Dr. McRuer enters into an examination of the merits of the modern doctrines in regard to the frequency, importance, pathology, and treatment of abrasions, excoriations, and ulcerations of the mouth and neck of the uterus.

When we examine all that has been written on this subject during the last ten years, and find, on the one hand, authors of unquestionable authority contending that disease of the os and cervix uteri is of extreme frequency, and that to it may be referred almost all the morbid sensations and conditions which occur in the female from puberty upwards, while, on the other hand, writers of equal weight and eminence insist that disease of the neck of the womb is of comparatively rare occurrence, and when present, that it is an affection attended, most commonly, with no other than local symptoms, and these of no decided prominence, while the general system is implicated only when the morbid condition of the uterus is very extensive, has been of long duration, or is of a malignant character—we can only reconcile this striking discrepancy—this direct opposition of opinion, upon the supposition that the same terms are made use of by the supporters of the two positions in very different senses. In no other manner can the remarkable discordance in their respective statements be accounted for, consistent with the supposition that they both deal in facts, based on observations in the truth of which they honestly believe. For it is to be recollected that they both predicate their opinions upon the results of actual observations made by them by means of the metroscope.

Notwithstanding, however, the different and dissimilar views entertained by recent writers in respect to the frequency and importance of ulceration of the os and cervix uteri, Dr. McRuer believes that a calm and unprejudiced observer may still be able to glean from the conflicting testimony advanced, some important pathological hints, and valuable therapeutical indications. Thus, from Dr. Bennet's admissions he considers we are warranted in inferring the two following important facts in opposition to his theory: namely, the trivial character of his so-called ulcerations; and their dependence upon constitutional and other maladies.

That simple ulceration of the uterus cannot be so formidable a malady as it is maintained to be by certain writers, Dr. McR. infers from the following facts:—

"In cases of procidentia, it is not uncommon to see the os and cervix honeycombed, as it were, with deep, ragged ulcerations, and it may be remarked here that all authorities who have written on this displacement admit that when the parts are returned to, and kept in, their natural position, and the patients observe a recumbent posture, with the occasional use of mild astringent washes, these really true *local* ulcers usually become soon cicatrized, and regain a perfectly healthful condition, without resorting either to the speculum or to the caustic."

From the facts and considerations adduced in the essay before us, Dr. McR. believes the conclusion to be almost irresistible that an affection which exists under every variety of symptom, some contradictory to such as usually attend upon ulceration in other parts, and even in the same parts, and at times giving rise to no symptoms whatever, must be rather a concomitant of various primary affections than a disease *per se*, and that it does not constitute a morbid centre from which irritations radiate to disturb and affect distant organs.

Dr. McR. believes that from constitutional disturbance, the secretions of the mucous membrane of the uterus, and especially from the glandular portion of the neck, become vitiated in character, and by their corrosive properties, irritate the surfaces with which they come in contact, producing those excoriations which are oftentimes attendant upon similar affections in other parts of the body; on the cheek from epiphora; on the nares and upper lip from coryza; on the glans penis from blennorrhagia; and on the rectum of children from mucous diarrhœa.

"In regard to the therapeutics laid down by both parties in this controversy, as the most judicious in cases of chronic leucorrhœa, attended or not attended by local lesions of the cervix, there is," Dr. McR. remarks, "no great difference of opinion, except so far as a resort to *destructive* cauterization is concerned, and the necessary and repeated introduction of the speculum; for it is agreed by all parties that absolute rest of the parts concerned is essential to their return to a normal state; consequently, all mechanical irritations arising from sexual congress, or sudden, violent, or prolonged movements of the body, ought to be avoided. It is neglect of this single requirement that, more than anything else, has prevented recoveries in the early stages of leucorrhœa, before any local abrasion whatever had manifested itself. Cleanliness of the vaginal passage, maintained by emollient and cooling washes, giving to them an astringency when the profuseness or liquid character of the discharges seems to require it, is another of the means which are recognized by the experience of all practitioners as requisite in the successful treatment of these affections. Attention to the general health is another important *sine qua non* in the treatment of lesions of the os and cervix uteri, or even of the vaginal passage. All causes tending to divert or confine the circulation to the pelvic viscera ought to be avoided and removed, such as long continued standing or sitting, as such positions favour gravitative congestions in the parts concerned, and consequently the vessels ought to be often relieved, by occasionally adopting a horizontal position for a short time during the day. Constipation, or the lodgment of hardened feces in the rectum, prominently comes within this category; but the measures used to remove this cause of congestion ought not to be such as to leave behind their operation an irritability equally as far removed from health as the congestion which they are designed to relieve. All drastic purgatives, therefore, especially those containing aloes, should be prohibited, and the necessary soluble condition of the bowels secured by attention to diet, the occasional use of tepid water injections or the mildest laxatives, and the strength sustained by a judicious selection of tonics, and as generous a diet as the patient can assimilate."

"A persistence for two or three months in a treatment embracing the principles just adverted to, choosing such particular remedies to fulfil the required indications as each individual case may seem to demand, modifying the persistence or activity of the treatment conformably with the constitutional idiosyncrasies of the patient, all of which cannot be precisely defined, but must be left to the judgment and discrimination of the attending physician, will, in most cases, remove the malady. But should the symptoms attendant upon chronic leucorrhœa persist in despite of the treatment thus laid down, then a resort to stronger local applications may be proper, from the supposition that local abrasions may complicate the case. Injections *per vaginam* of solutions of sulph. zinci, or decoctions of oak or Peruvian bark, daily used after the tepid water *washings*, or a solution of nit. argent. of the strength of gr. vj to xij, to ℥j of distilled water, may be advantageously substituted once a week, it being not the destructive, but the *antiphlogistic* or *vital modifying* effect of this agent that is required in such cases, as has been so admirably described and enforced both by M. Andral and Prof. Meigs."

From the facts and arguments he has adduced, Dr. McR. feels warranted in presenting the following propositions as those fully substantiated by the testimony of the most eminent observers in different parts of the world, and corroborated by legitimate deductions derived from the application of well-established principles in physiology and pathology to the phenomena connected with the diseased condition in question.

"1. That 'ulceration' is a lesion presenting an excavation or solution of continuity, produced by a molecular death, the lifeless elements being absorbed back into the circulation through the action of the absorbents, and is generally the result of a constitutional cause; while abrasions and excoriations are produced either by mechanical or chemical agents—by the attrition of foreign bodies, or the escharotic effects of morbid secretions, usually the product of other parts, and coming in contact with the ulcerated surface.

"2. That while abrasions or excoriations are of frequent occurrence on the cervix uteri, especially in the pregnant female, ulceration rarely exists on this

part, excepting from *mechanical* or *specific causes;* and that all of these lesions, when not of especial character, are of themselves of trivial importance, only demanding by their complication with other more important diseases, the serious attention of the medical practitioner.

"3. That the demonstrative use of the speculum, or the direct application of caustics, is seldom justifiable or required in the diagnosis or treatment of diseases of the cervix uteri; for that tactile demonstration is more to be relied upon than specular examination, and that the application of caustic agents for the cure of simple lesions ought never to be made *destructive*, but only to produce a modification of the molecular action of the parts diseased, and that this can be done by carefully using solutions of a strength sufficient to produce the latter effect on a denuded surface, without the possibility of endangering the adjoining healthy parts whose epithelial covering has not been destroyed.

"*Finally:* that as abrasions, excoriations, and ulcerations of the cervix uteri, are, in a great majority of cases, the results of constitutional disease, or functional derangement, therefore the treatment of these lesions to be permanently successful, must be principally directed to the general vitiation, or the physiological disturbance; and that to pronounce the local affection a disease *per se*, is to encourage a practice, which, while it does not remove the organic evil, subjects the patients to a greater injury by doing violence to their moral sensibilities." D. F. C.

ART. XXIX.—*The Hymen.* An Essay delivered by appointment before the New York Medical Union. By T. GAILLARD THOMAS, M. D. New York, 1859.

THIS is a highly interesting essay on a subject which, though intrinsically of little moment, has, nevertheless, been invested with a singular degree of importance, in consequence of the mistakes which have been made, and the disputes which have thence arisen in respect to it.

The history of the hymen, as Dr. Thomas has very correctly remarked, presents one of the most remarkable instances of the direct contradiction of authorities in regard to what, at a first glance, we should certainly suppose could admit of neither doubt nor diversity of opinion.

For a long period the presence of the hymen was relied upon as the essential seal of virginity, and its absence as a necessary and positive indication of the fact that sexual congress had taken place; the life, the honour, and the holiest affections of the female heart being jeoparded by these false assumptions. On the other hand, the very existence of anything answering to the hymen has been most positively denied, excepting as an abnormal condition of the female vagina.

Happily, while the results of modern investigations have proved that, as a general rule, there can be no doubt of the existence of a hymen in the virgin state, they also show that it is, nevertheless, often congenitally absent, and that it may be frequently destroyed during infancy and childhood by various accidental causes. Consequently, its mere absence can no longer be admitted as a conclusive proof that sexual intercourse has taken place, nor its presence as a certain sign of virginity. The persistence of a hymen after copulation, and even after the occurrence of conception, has been shown to be the case in very many well-authenticated cases.

All the facts connected with the literature of the hymen, its anatomy and physiology, its medico-legal relations and its diseases, have been collected with no little industry by Dr. Thomas, and will be found clearly and accurately detailed in the essay before us. D. F. C.

ART. XXX.—*On Cough: its Causes, Varieties, and Treatment; with some practical Remarks on the Use of the Stethoscope as an aid to Diagnosis.* By ROBERT HUNTER SEMPLE, M. D., Member of the Royal College of Physicians of London, Physician to the Northern Dispensary, etc. etc. London, 1858. 12mo. pp. 174.

ALTHOUGH we have no particular fault to find with the views, generally speaking—physiological, pathological, or therapeutical—advanced in the work of Dr. Semple, still we are compelled to pronounce it to be one calculated to benefit very little, if at all, either the student or the practitioner. It certainly supplies no want in our medical literature; advances nothing new on either of the topics embraced in it; teaches, in fact, nothing but what is much better taught in any one of our leading systematic works of the practice of medicine.

Cough can be considered, with propriety, in no other light than as a mere effect of some irritation affecting, either directly or indirectly, the organs of respiration, and which can be arrested only by the removal of the latter. It is impossible to erect it into a disease of itself, nor can it scarcely be considered in any case, if it be not perhaps in the single one of hooping-cough, as in a strict sense pathognomonic.

As questions in general pathology, the cause and character of cough, and the pathological indications to be derived from it, are, of course, important subjects of inquiry; but it is not exactly in this point of view that the subject is treated of by Dr. Semple. Under the head of pathology and treatment of cough he enters into a brief consideration of the pathology and treatment of the more prominent of the diseases of which it forms a leading symptom. A consideration far too brief to present anything like a full and useful exhibition of the present state of our knowledge in relation to these affections, or to lead to the formation of a satisfactory diagnosis, or to the eduction of correct indications for their management.

As a general proposition, it is unquestionably true, that the only means by which a removal of cough can in any case be effected is the cure of the existing morbid conditions of the respiratory or other organs by which it is produced or kept up. Still, it may undoubtedly be allayed—that is, the violence and duration of its paroxysms may be reduced, and the intervals between them increased—by remedies which differ somewhat from each other in different cases. But although this fact is to be kept constantly in mind when we have under care any of the diseases of which cough is a troublesome symptom, still the employment of remedies expressly to allay cough, and the good derived from their use, are to be viewed as of secondary importance to a proper treatment adapted for the arrest of the malady with which the cough is associated. To consider the palliatives of any given symptom separately from the therapeutic management of the disease itself to which that symptom appertains is scarcely possible; but, even were it attended with no difficulty, it can serve no good purpose. This is especially true in respect to cough, the causes of which are numerous and diverse, and the principles upon which its treatment is to be based are in different cases dissimilar, and even opposite.

D. F. C.

ART. XXXI.—*New Surgical Treatment for Malformation of the Urinary Bladder.* By DANIEL AYRES, M. D., LL.D., Surgeon to the Long Island College Hospital, etc. New York, 1859. 8vo. pp. 14.

ONE of the most legitimate and beneficial ministrations of operative surgery is in its efforts to remove or lessen the discomforts and disabilities to which many of those labouring under certain congenital malformations would otherwise all their lives be subject. Among these malformations, exstrophy or extroversion

of the urinary bladder ranks as one of the most hideous and disgusting—Those in whom it exists are repulsive to their associates under all circumstances, and, unless born in affluent circumstances, become literally outcasts from society.

In different cases of exstrophy of the bladder, the nature, extent, and, to a certain degree, the character of the malformation very materially differ. The greatest variations among these cases arise from the more or less imperfect development, malposition, or entire absence of different portions of the genital organs, in both sexes.

It has never been the good fortune heretofore of any one to execute or devise an operation adapted to remove in even the simplest case of exstrophy of the bladder, the existing deformity, or to remedy to any extent the inconvenience which necessarily results from it.

It is this which renders the case reported by Dr. Ayres one of peculiar interest. It occurred in a female, 28 years of age, who was admitted into the Long Island College Hospital, November 1st, 1858, in consequence of a prolapsus uteri succeeding to parturition, and by an ingeniously devised and skillfully executed operation was effectually relieved of both the malformation of the urinary organs and the displacement of the womb.

On the 20th January, 1859, the patient, we are told, was examined at the hospital, in the presence of a number of medical gentlemen, she having walked a distance of two miles without experiencing any inconvenience. The parts were all found sound and firm, and her general health and spirits much improved. Thus, by a well-devised and executed plastic operation, was remedied a malformation, in respect to which we are assured by Erichsen all former plastic procedures have proved unsuccessful, and even in some instances have terminated in the death of the patient.

Some idea may be formed of the difficulties that had to be overcome in the case described by Dr. Ayres, from a mere statement of the indications that it was necessary to fulfil by the operation. These were—1st. To form an anterior wall for the exposed bladder. 2d. To restore the urinary canal. 3d. To establish the anterior fourchette of the vulva, and 4th. To supply means to prevent the prolapsus of the uterus, and to collect the renal secretions.

For a description of the operation we must refer to the publication before us—it would not be clearly understood without the diagrams by which it is illustrated.

D. F. C.

ART. XXXII.—*A Practical Treatise on the Diseases of Infancy and Childhood.* By T. H. TANNER, M. D., F. L. S., Licentiate of the Royal College of Physicians, late Physician to the Hospital for Women, etc. 12mo. pp. 464. Philadelphia: Lindsay & Blakiston, 1859.

As a manual for the use of the student—as a merely general outline of the etiology, pathology, and therapeutics of the maladies incident to infancy and childhood, the work of Dr. Tanner may be very confidently consulted. It is well adapted to supply the only legitimate purpose for which a manual of any department of science can be required.

With the same faults and imperfections which mark nearly all the works of its class, and liable to the same leading objections to which, almost without exception, they are obnoxious, the work before us can, however, lay claim to a degree of correctness, in which the generality of them are sadly deficient. Although we cannot assent to the correctness of the character claimed for it by its author, of "a complete treatise on the disorders of infants and children, within a moderate compass," we nevertheless admit that, so far as it goes, it is in strict accordance with the views of the most reliable modern authorities on the subjects it embraces.

The fault of Dr. Tanner's treatise is not that it inculcates unsound views in respect to the nature of the diseases of early life, or erroneous directions for

their management, but that it is too concise, general, and sketchy in its descriptions of the phenomena of these affections, in its elucidation of their nature, and in its exposition of their proper treatment. It but barely satisfies the objects for which alone the student should consult its pages, and can afford but little light to guide the practitioner to the knowledge of which he stands most in need at the bedside of the sick infant or young child.

The first one hundred and twenty-seven pages are devoted to general observations on the period of infancy and childhood—the amount of mortality which occurs at these stages of life; the means by which this mortality may be diminished—peculiarities of the infant structure and constitution, and of the diseases which then occur—the medical examination of infants and children—the diagnosis and prognosis of infantile diseases—the therapeutics of infancy, and the management and education of children. The four chapters into which this introductory portion is divided are among the most interesting in the volume before us; they are fuller and more complete than either of the remaining sixteen, that are devoted to the consideration of the individual diseases and accidents incident to the earlier years of existence. D. F. C.

ART. XXXIII.—*A Manual of Elementary Chemistry, Theoretical and Practical.* By GEORGE FOWNES, F. R. S. From the seventh revised and corrected London edition. Edited by ROBERT BRIDGES, M. D. Philadelphia: Blanchard & Lea, 1859. 8vo. pp. 600.

IT is with pleasure that we notice the appearance of a new American edition of this valuable work. The rapid advance made in the science of chemistry renders necessary the frequent revision of elementary treatises on this branch of science, especially such as are intended as guides to the student just commencing his studies. This necessity is apparent, on even a superficial examination of the present in comparison with the last American edition. In the preliminary parts, where physical science is treated, it will be found that the articles on light and electricity have been improved by additions on polarization of light and photography; by description and illustration of Bunsen's battery and the inductive coil of Rhumkorff; in the course of which very interesting modern improvements are presented to our notice. The inorganic portion does not afford any striking addition, the alterations consisting in the producing here and there such observations of fact and theory as may in the interval of publication have been made public, consisting generally of short paragraphs inserted in the text in their appropriate places, without note or comment. Of this character may be noticed remarks on ozone, teroxide of hydrogen; the discoveries of Wohler and Deville on the modifications of silicon and boron, showing their isomeric relations with carbon; the recent observations of the same investigators on strontium, magnesium, alumium, manganese, and chromium, and the improved chemical methods of separating these metals.

It is, however, in the third part, organic chemistry, in which additions are most numerous. Here the preliminary observations are extended by additional notices on the effects of heat and improvements in the modes of applying this agent in organic analysis. The enumeration of the different alterations and additions made to the various groups of organic nature would require a critical analysis for their clear elucidation; but it is sufficient to state that they are of such a character as we would expect from the able editors into whose hands the revision has fallen since the death of the author. It is, perhaps, in the alcoholic series and the artificial organic alkalies, where the most noticeable additions are to be found, and for the exposition of which there are none more competent than the editor (Professor Hoffmann), to whom science owes so much in this respect.

This edition is uniform in appearance and type with the former, differing only in the increased number of pages and illustrations, and may be considered as the most useful text-book for the student of chemistry that has as yet appeared.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Physiology of the Thymus Gland.*—Dr. Friedleben concludes from his researches on this subject, that the thymus is an organ which, during the growth of the body, ministers to nutrition and blood-development, and therewith to building up of the tissues.—*B. & F. Med. & Chir. Rev.*, from *Die Phys. der Thymus Drüse.*

2. *Practical Deductions from an Experimental Inquiry into the Influence of Food.*—Dr. Edward Smith read an interesting paper on this subject before the Royal Medical and Chirurgical Society, May 10, 1859. In some preliminary remarks the author referred to the large amount of vital action which is necessary to maintain life, and mentioned the various circumstances which he had noted during the continuance of a prolonged fast. He stated that the practice of administering arrowroot, or other fashionable foods consisting of starch, with water, under the impression that it was more nutritious and easier of assimilation than wheat flour, was indefensible, since it did not sustain the vital action to a degree capable of maintaining life, and that nature has not provided starch as food altogether apart from nitrogenous substances. He contrasted the action (or rather want of action) of starch with that of the cereals, and showed that the latter is nearly as great as that of any substances with which we are acquainted. He drew the distinction between an action which increases the existing amount of vital power, and that which only tends to prevent loss of vital power—two circumstances which in practice are commonly confounded; and showed that beef-tea, wines, and brandy can act only in the latter mode, while the cereals act in the first-named manner. Hence, in cases of prolonged exhaustion, where there has long been more waste than supply, the former is not sufficient, and it is essential that the latter be added or substituted.

The action of milk is exceedingly analogous to that of the cereals both in extent and duration, and the combination of the two appears to be the most perfect kind of food. The casein is to the milk what gluten is to bread, and the oil in the milk with substances (respiratory excitants) which call it into action, in a manner quite analogous to the common combination of bread and butter, or of a mixture of fat and lean flesh. The author showed that milk and flesh were the best and most natural modes of administering fat, and altogether preferable to the administration of separated oils. He referred to the frequent use of skimmed milk in Germany as a medicinal agent, and of sour milk in Greece and America as a part of food; and explained the action of the former by its casein and sugar as respiratory excitants; and that of the latter by the advantage of administering lactic and other acids in that combination in the summer season and at other times, when the blood, by tending to undue alkalinity, is

less capable of carrying on the oxidizing process. He showed that in fevers skimmed milk is preferable to new milk.

As fats lessen the respiratory changes, they ought to be, and are, combined with other articles of food which increase them. The author referred to the importance of determining the seasons for the administration of both fat and starch, and showed that there is less difference in the relative amount of these two substances, used in different climates, than has been commonly believed. He attached importance to the physical properties of fat, and explained the beneficial action of that substance when applied to the skin. He thought this latter mode of employing fat to be especially fitted for cases of debility, with lessened appetite and perspiring, soft skin, in which state the waste is always greater than the supply. The beneficial action of sugar was insisted upon; and the love of the French for sugar and water was explained by the refreshing coolness, the innocuousness, and the agreeable flavour of the fresh-made beverage, and the great freedom and lightness of the respiration which attend its action. He thought the ill effects of sugar in the healthy system had been exaggerated. The action of animal substances in increasing the respiratory process, in addition to the supply of plastic material, was dwelt upon, and shown to be of great value to the system. These are allied to gluten, and some of them probably act as ferments; and, in illustration, he especially cited cheese, which promotes assimilation if taken in small quantity, but is apt to disturb it if much is eaten. Tea was shown to cause increased waste, and to excite every function of the body, and hence was well fitted to cases where there was a superfluity of material in the system, or where we otherwise desire to induce a temporary increase in the vital action; but is injurious to those who are under-fed, or in any case where there is greater waste than supply. In illustration, the author cited the increase in the loss of weight in the prisoners at Wakefield when tea was added to their food. The action of tea has been hitherto misunderstood, but the sagacious observation of Liebig as to its analogy with the active principle of the bile was much commended. He (Dr. Smith) recommended its use instead of spirituous liquors by soldiers on march, or otherwise exposed for a lengthened period to great heat; since by its powerful influence in increasing respiration and the action of the skin, without increasing pulsation, it was particularly fitted to counteract the influence of heat in its tendency to induce heat-apoplexy, or, as more suitably termed by Mr. Longmore, "heat-asphyxia;" twenty-five grains of tea in a concentrated cold infusion, taken every hour or half hour during exposure would suffice. For similar reasons, he urgently recommended it as an adjunct in the treatment of suspended animation, as from immersion. It has a rapid and accumulative action, so that the small and repeated doses have much greater effect than larger and more isolated ones. It differs from coffee chiefly by increasing the action of the skin, and thereby tending to cool the body, and therefore the two substances are applicable to different conditions of system. He thought that both, and particularly tea, ought to be more commonly used as medicinal agents. Coffee-leaves he believed to be a valuable febrifuge medicine, and one particularly fitted for cases of nervous excitability.

The author then contrasted the effects of brandy and gin with tea, and showed that in all respects they were directly opposed; but coffee so far resembled them in action, that it lessened the action of the skin, and thereby lessened refrigeration. Rum and beer he regarded as restoratives, and the combination of rum and milk as the best restorative employed as food; while brandy and gin simply lessen waste. He regarded all alcohols as having their chief influence in sustaining the action of the heart, and recommended that they should be given in small quantities, and repeated every quarter of an hour or half hour in urgent cases, so as to accumulate their action, rather than allow reaction to follow each dose by permitting a long interval between the doses. He mentioned a case in which he gave six bottles of port wine in forty-eight hours, with the effect of sustaining the patient's life, and reducing the pulse from 150 to 90 per minute. He believed that alcohol increased the respiratory action indirectly through the nervous system, and that in fine old wines and spirits this action is lessened by the volatile elements, which have a conservative tendency. He

particularly cited the conservative influence of fine old port wine, and the disturbing influence of new and inferior spirits. The primary and secondary action of all alcohols, when taken in an amount to affect the sensorium, was always felt, and the author described the attendant circumstances.

In conclusion, Dr. Smith stated that dislikes for foods are indicative of lessened action, and that other foods of analogous properties should be provided in such cases; and also that it was probable that at least some kinds of azotized substances are more fitted for the hot season, when the chemical changes are greatly reduced, than has been heretofore believed.—*Med. Times and Gazette*, May 21, 1859.

3. *Researches into the Nature of the Involuntary Muscular Tissue of the Urinary Bladder.*—Mr. G. V. Ellis, Professor of Anatomy in University College, London, in a communication read to the Royal Society, endeavours to show that the involuntary muscular tissue of the bladder, and the voluntary muscle in other parts of the human body, have a like composition, and that Prof. Kölliker's view, that involuntary or smooth muscle is made up of fusiform cells, is incorrect. On the contrary, the muscular substance of the bladder is composed of lengthened fibres, with fixed and tendinous terminal attachments. The fasciculi of muscular fibres in the bladder are interwoven into a network, and are marked at varying intervals by tendinous intersections, like those of the rectus abdominis on a small scale.

The author terms what are usually called the "nuclei" of the muscular tissue —"corpuscles," and distinguishes two varieties of them, the oval and the fusiform. The latter are the more numerous, and are the rod-like nuclei of Kölliker. Two or even three of these may be observed in the length of a single fibre. If a single muscular fibre of the bladder is isolated, it will be found to terminate as in voluntary muscle; connective tissue investing not only the fibre, but each of the separate portions into which it ultimately divides.

The author considers that the "sarcous elements" of voluntary muscle are represented by the lines of dots visible in the muscular fibres of the bladder.—*Dublin Hosp. Gaz.*, May 15, 1859, from *Proceedings of the Royal Society.*

MATERIA MEDICA AND PHARMACY.

4. *Hydrochlorate of Ammonia.*—This article, though long esteemed on the continent of Europe as an internal medicine, has been but little used either in Great Britain or in this country. Dr. M. J. Rae, in a recent paper (*Lancet*, Dec. 11, 1858), states that an experience of eight years with it has led him to entertain a high opinion of its curative powers in various diseases.

Dr. R. says he has used it with marked success in goitre. "In several of the cases, where the local application of the muriate was conjoined with its internal administration, the tumours—some of which were very large—rapidly diminished in size, and were soon reduced to the normal condition. It cured the whole of the cases (ten in number) in which it was tried, the period of cure extending from a fortnight to two months. The subjects of treatment were mostly factory girls, of ages varying from fourteen to twenty. To test the powers of the muriate fairly, it was given alone in mucilage, or infusion of quassia, and combined with soap liniment for external use." Dr. R. made a comparative trial of the muriate of ammonia and iodide, and he found the former to act as speedily and effectually as the latter.

Dr. R. also extols this salt as a valuable remedy in hooping-cough. He has tried it in thirty-seven cases, with a most satisfactory result. Of this number two died, both hopeless cases. Two were doubtful, the patients having been removed from town before the cure was completed. "In the thirty-three remaining cases, the majority of which were of more than ordinary severity, the average period of cure was about twenty days. But in most instances,

when the patient was at all favourably placed, and came early under treatment, the disorder yielded in from nine to fifteen days. The remedial influence of the muriate in the disorder is," Dr. R. says, "immediate and decided. Under its use the expectoration soon loses its irritating, glairy character, becoming bland and less tenacious, and the paroxysms are rendered milder, less frequent, and of shorter duration; in fact, by its influence the little patient seems to be carried more easily, quickly, if not at the same time more safely, through the attack than by the agency of any other remedy with which I am acquainted. In most cases the muriate was given in mucilage, or with liquorice water, combined with an aromatic, and in doses of one to five grains, according to the age of the child, and repeated every four or six hours.

"When pneumonic or bronchial complications existed, or were threatened, antimonial or ipecacuanha wine, with morphia or hyoscyamus, were added to the ordinary mixture. The only inconvenience observed to result from the use of the muriate was the occasional supervention of a slight mucous diarrhœa, which was easily checked, and did not interfere with the treatment."

Dr. R. has also found this article useful in enlarged lymphatic glands, in indolent bubo, and in scrofulous ulceration of the lymphatic glands. In several aggravated cases of this sort which have come under his observation, some of which presented a chain of foul, ragged ulcerations extending from ear to ear, the muriate acted with great rapidity; and in some instances, where iodine, syrup of iodide of iron, and other medicines, had no effect, the ulcerations quickly healed under its employment.

"It is also," he asserts, "a very excellent remedy in many forms of cutaneous affections, more especially in the scaly variety. I have seen cases of psoriasis inveterata which had resisted the long-continued use of arsenic, iodine, and other remedies, quickly yield to its influence. It seemed to me to have the most decided effect in those cases of psoriasis occurring in patients of dissipated habits, or when complicated with enlarged liver. It is also very useful in eczema and syphilitic squamæ. Drs. Watson, Ebden, and others, recommend the muriate in tic and facial neuralgia, and it certainly possesses very considerable curative power over these painful affections, and particularly over that form of neuralgia mentioned by Dr. Watson, which is confined chiefly to the lower part of the face, and in a very troublesome variety affecting one or other side of the neck, and probably connected with a morbid condition of the cervical lymphatic glands.

"The muriate, like other remedies in neuralgia, does not succeed in every case; but in those cases in which it proves successful, the beneficial effect generally follows soon after its administration. In my hands the best results were obtained with it in neuralgia when it was given in the ordinary dose, and repeated every half hour or hour."

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5. *Iodide of Sodium.*—Mr. ALEX. URE states (*Lancet*, April 2, 1859) that "iodide of sodium, as a therapeutic agent, is and ought to be more active than iodide of potassium, since it is richer in iodine. According to Gmelin, iodide of sodium contains 84.45 parts of iodine in the hundred, while iodide of potassium contains but 74.27, the proportion of sodium, though small, being still sufficient to cover the irritative quality of its associate.

"As far as my experience goes, iodide of sodium is a blander salt, more assimilable, and better borne by the stomach, than iodide of potassium. It is, moreover, much less prone to produce symptoms of iodic disturbance. Patients under my care have taken it steadily for weeks together, without suffering the slightest inconvenience, and with uniform advantage as regarded the morbid condition. On no occasion, save one, has there been any complaint made of this medicine producing sense of weight or uneasiness referred to the stomach, nausea, impaired appetite and digestion, headache, running from the eyes and nostrils, general nervous depression—symptoms which, at times, supervene during the administration of iodide of potassium even in moderate doses. The instance in question was that of a puny, scrofulous boy, with disease in both knee-joints.

"As a general rule, the preparations of soda are milder in their operation on the system than those of potash. If, moreover, the important view first announced by M. Dumas, in the 92d volume of the *Annales de Chimie*, be

accepted, that there are certain salts which leave the blood the faculty of becoming arterialized, while others deprive it of this property, and that the salts having soda for their base are more proper to maintain this condition of integrity than those of potash or ammonia, it may be fairly assumed that the former are likely to exercise a more favourable remedial influence than the latter, especially if exhibited continuously for a length of time. Soda, variously combined, is diffused extensively throughout the organism; fully five-sixths of the saline constituents of healthy blood consist of salts of this base.

"Iodide of sodium may be prescribed in all cases in which the employment of iodide of potassium is indicated, as antidotal to various constitutional symptoms of syphilis, chiefly of the so-called tertiary group, and where mercury has been properly used beforehand; in certain forms of rheumatism; in chronic affections of the joints and bones of a scrofulous character, particularly where a stealthy inflammatory process has determined copious fibro-plastic deposition or hypertrophy. If judiciously administered, it may be given in progressively increasing doses, where it is desirable to produce a decided alterative effect on the system. M. Gamberini has furnished a brief notice respecting its use in the volume of Schmidt's 'Jahrbücher' for 1858. Reference is made to 116 cases of constitutional syphilis in which it had been exhibited, and where it was found to have acted more rapidly than iodide of potassium, and often proved efficacious where the latter drug had been of little or no avail. It is there recommended to be given as follows: One scruple is to be dissolved in three ounces of distilled water, and this is to be swallowed in divided doses in the course of the day. After the lapse of two or three days, the above amount is to be augmented by the addition of six grains, and so on, until eventually the patient comes to take two drachms, or even more, of the salt daily; the time for taking each dose being an hour before meals.

"Hitherto I have usually prescribed the iodide of sodium to the extent of five or six grains twice or thrice daily, dissolved in four ounces of compound decoction of sarsaparilla, which forms a convenient vehicle; occasionally, in pure water, with the addition of five grains of bicarbonate of soda to each dose; this serves to counteract acescency, and the consequent liberation of hydriodic acid in the stomach, which is sure to cause headache. In scrofulous complaints, I have given it combined with cod-liver oil, and with manifest benefit. A remarkable and unexpected effect was observed in one instance under this treatment for diseased bone, where a marked improvement of sight ensued from diminution of a nebulous condition of the cornea. In constitutional syphilis, I have found it advantageous occasionally to conjoin the use of the iodide with that of bichloride of mercury, should mercury have been previously withheld, or imperfectly introduced into the patient's system.

"As a general rule, the iodide ought to be administered in plenty of liquid, and not on an empty stomach, as suggested by the above writer. It is readily soluble in water, has a cooling, saline taste, certainly preferable to that of the potassium compound, and by no means equally persistent in the throat."

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6. *Ethereal Oil of Horsechestnut as a Local Remedy in Gout and Rheumatism.*—The bark of the horsechestnut, from its containing a bitter principle, forms a tonic medicine which has been classed among the substitutes for quinine; the roasted pulp has been recommended in atonic uterine hemorrhages, and the ethereal oil has been indicated as a topical agent at the commencement of gouty and rheumatic attacks. This oil is obtained from the powder of the horsechestnut by treating it with ether, which takes up the oil, and afterwards evaporating the ether. This oil is employed as a mild inunction on the inflamed part, and when there is great sensibility, the inunction is employed in a circular course round the inflamed part, so as to arrive gradually at the centre. Dr. Masson, who has made numerous experiments with inunctions of the ethereal oil of horse-chestnut as a method of arresting the local symptoms of gout, states that he has remarked an exasperation of the pain during the first half-hour following the application, but that after this period there was manifest relief.—*Bull. Gén. de Thérap.*, Sept. 15, 1858.

7. *Formula for the Combination of Nitrate of Bismuth with Copaïba and Cubebs.*—According to the observations of M. CABY, the nitrate of bismuth combined with the balsam of copaiba and powdered cubebs, possesses the property of neutralizing the irritating effects produced habitually by these medicines on the digestive canal. The formula which is employed at the Hospital of St. Lazare, is a mixture of equal parts, by weight, of balsam of copaiba, powdered cubebs, and nitrate of bismuth, with some essence of peppermint as flavouring ingredient. This combination is said to be supported easily by the most delicate stomachs; there is no excitement, epigastric heat, or diarrhœa, so that the action of the medicines being entirely concentrated upon the genito-urinary passages, the desired results are more rapidly and easily obtained.—*Ibid.*

8. *Best Form to be given to certain Pharmaceutical Preparations intended for External Use.*—In an article in the *Bulletin Gén. de Thérap.* (May 15, 1858), it is remarked that greasy applications to the skin do not possess, in general, any great therapeutical efficacy, and it is therefore suggested that they might be advantageously replaced in many instances by saponaceous compounds. In studying the action of the latter, M. DESCHAMPS composed a soap with iodide of potassium, and rubbed it in four times upon his epigastrium. He analyzed his urine in the intervals of the frictions, and found it to contain appreciable quantities of iodine. He afterwards washed with water the part which had been rubbed with the soap, and he found in the liquid some fatty acids arising from the decomposition of the soap by the fatty acids secreted by the skin, together with iodide of potassium in solution. These washings were continued for five days successively, and every day some iodine and fatty acids were obtained. These facts prove that the skin is easily penetrated by saponaceous compounds; that the skin rejects a part of the principles which it absorbs; and that therapeutical agents may pass through the skin, diffuse themselves in the system, produce physiological effects, and be expelled by the ordinary passages. M. Deschamps has, therefore, proposed to employ certain saponaceous compounds, instead of liniments and pomades, in cases where the surface of the body, to which these preparations are to be applied, is not denuded. These soaps contain respectively iodide of potassium, laudanum, ammonia and laudanum, extract of belladonna, sulphuret of sodium, and digitalis, combined with an alcoholic solution of soap. —*B. & F. Med.-Chirurg. Rev.*, April, 1859.

9. *A New Mode of Preparing Hydrate of Magnesia as an Antidote to Arsenious Acid.*—The hydrate of magnesia having been proved to be superior to peroxide of iron as an antidote to arsenious acid, M. Guérin has proposed a new plan of preparing the former, which consists in substituting ammonia for potash in the precipitation of the magnesia. The sulphate of magnesia is the salt employed. The hydrate of magnesia may be prepared extemporaneously by rapidly dissolving a considerable quantity of sulphate of magnesia in common water, and adding to it some caustic ammonia, until the ammoniacal smell is perceptible; then the whole is to be filtered, the hydrate of magnesia collected, and administered in a state of suspension in water. The superiority of this mode of preparing hydrate of magnesia is said to consist in the entire absence of potash in the preparation; for in the treatment of arsenic poisoning, if any portion of potash should be present, an arsenite of potash would be formed, and the risk of the patient would be increased instead of being diminished.—*B. & F. Med.-Chirurg. Rev.*, Ap., 1859, from *Bull. Gén. de Thérap.*, Aug. 30, 1859.

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

10. *Coup de Soleil.*—Dr. WM. PIRRIE, late assistant surgeon to the 71st Highland light infantry, has related (*Lancet*, May 21 and 28, 1859) the results of his

observations of numerous cases of sunstroke, which occurred during Sir Hugh Rose's summer campaign of 1858, in Central India.

The mode of death in all but the rapid form, is evidently, he says, by apnœa, "or at all events the symptoms of apnœa plainly predominate; and hence the name 'heat-asphyxia,' given by some to this most alarming disease. The symptoms are distinctly those of that mode of dying in which death commences in the lungs; but by what means the circulation begins to be arrested in the lungs —or, in other words, the manner in which high temperature operates in causing stagnation of blood in the lungs—whether it be by giving rise to immense engorgement, or by causing imperfect arterialization of the blood—I do not consider myself qualified to give an opinion. * *

"It is quite possible," he further remarks, "that even in the forms of sunstroke in which the respiratory apparatus is primarily affected, there may be some degree of cerebral syncope, even from the commencement; but, although it may be an erroneous impression, the study of such cases produced in my mind the belief, held by many, that death is caused by apnœa, or that the symptoms of that form of death predominate.

"In the forms of sunstroke in which the patient, without any premonitory symptom, falls down insensible, makes a few gasping efforts to breathe, and in a few minutes expires, the symptoms appear very clearly to indicate death beginning in the brain. The sensibility is first destroyed, and, as a necessary consequence, the functions of the lungs are suspended, and circulation of venous blood takes place: circulation of venous blood in this form of dying being the *consequence* of the loss of sensibility; whereas in death by apnœa it is the *cause*. The essential anatomical characters of both modes of death being the same, presenting only differences of degree in the chest and in the head, it is chiefly by the symptoms during life that an opinion can be formed as to whether death was caused by coma or by asphyxia. I am quite aware how speedily sensibility is destroyed in death by opnœa; but many cases of sunstroke produce a strong conviction in the mind of the medical observer, that sensibility ceases first, and that death begins in the brain."

With regard to the treatment, Dr. Pirrie says his testimony may be given in a few words. "In many cases of almost instant death by sunstroke, life was lost before it was possible to institute any mode of treatment; and, in many others, the powers of life were so thoroughly sunk from the moment of seizure that remedies produced no impression on the symptoms. In no case was general bloodletting at all beneficial, but decidedly the reverse. In many instances, I have seen it employed by men of great experience who were well qualified to judge when it was likely to be useful, and the results were always unfavourable; and I have been told by many who had ample means of observation during the summer campaign of 1858, that venesection always seemed to hasten a fatal termination. The result of bloodletting seemed of itself sufficient to show that the vital organs are overpowered by some influence in addition to that of local congestion.

"The treatment most generally useful consisted in removing the patient to the shade as speedily as possible—in preserving the body in a proper position—in the energetic employment of cold affusion to the head—in producing as cool an atmosphere as possible around the patient—in the diligent use of friction and heat to the extremities and other parts, so as to cause derivation from the head and chest—in acting sharply on the liver and bowels by mercurial and other purgatives—in frequently administering diffusible stimuli, and in causing determination to the surface of the chest by applications of mustard or of turpentine. Along with these remedies, local depletion from the head seemed sometimes to be beneficial. When the patient became comatose, blisters to the back of the neck, and stimulating cataplasms to the feet or legs, were tried; but, in too many instances, they were of no avail.

"Another measure, to which Dr. Simpson, of her Majesty's 71st regiment, attached importance, was to engage the patient's attention by keeping him answering questions put to him in a loud tone of voice; to rouse him up by continually talking to him, and by rubbing his limbs; and not to leave him to himself till the remedies should have fair time for their operation. This expe-

dient seemed, in some cases, to assist in warding off the insensibility, if not in some cases to prevent its accession.

"Under the use of the above-mentioned treatment, modified according to circumstances, many patients recovered; but, in too many instances, the result was fatal to those who were attacked with this singular disease."

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11. *Coup de Soleil.*—It appears, from the report of THOS. LONGMORE, Esq., Surgeon to the 19th Regiment, that no less than 16 cases of heat-apoplexy occurred in that regiment, while stationed at Barrackpore, between May 23d and June 14, 1858.

Mr. Longmore specially calls attention to a symptom, important from its constancy and early manifestation—we mean irritability of the bladder. In the case of Lieut.-Colonel S——, "the *first* thing of which he complained was irritability of the bladder. If this symptom should prove to be a general precursor of the attack, it might be rendered valuable as an indication of the approaching danger, which, by early and proper care, might then probably be averted; and its presence at a time when heat-apoplexy was prevalent would make the surgeon alert to obviate the more serious symptoms which might be expected to follow." The doctrine here implied is that of the *local* warning (symptoms) of disease in operation at, perchance, a remote distance in the body, and which, being itself far removed from the scene of its local manifestation, would not *appear* to be the cause of such topical disturbance. This doctrine, in its important relation to diagnosis, is fully enunciated in a work just published.[1] At page 11 of that work, Mr. Gant observes: "Irritability of the bladder, for instance, arising from some morbid condition of the urine, may prove to be the local warning to an individual, which first directs his attention to that condition, itself due to a far more grave disease of the kidneys, the stomach, or the nervous system. Hence the value of many symptoms, which, although themselves comparatively insignificant, may, nevertheless, guide us to discover latent disease in some distant and hitherto unsuspected organ."

Appearances on examination after death.—"In all the cases," Mr. L. says, "much the same appearances were presented as if the patients had died asphyxiated from some cause. Thus, excessive engorgement of the lungs, amounting generally to complete obstruction of the pulmonary circulation, and, in parts, having all the appearance of true interstitial apoplexy, was most remarkable. The cerebral congestion, less marked in character, and less constant in amount, seemed to me *secondary* to the failure of the due performance of the act of respiration, and, perhaps, resulted from loss of tone in the vessels, and from enfeebled action of the heart, consequent upon the imperfectly oxygenized blood it was receiving." In conformity with these post-mortem observations of heat-apoplexy, Mr. Longmore would term this disease "heat-asphyxia;" and the treatment which proved most successful would seem to corroborate this view of its pathology.

Treatment.—"Cold effusion by mussucks of water, poured over the head, chest, and along the spine; counter-irritation by means of mustard poultices to the chest, purgative enemata, and afterwards, when the head remained oppressed, blistering to the nape of the neck." Venesection was not found useful, but topical blood-letting seemed advantageous when there was much fulness of the superficial veins about the head and neck. The duration of the disease presented two extremes. "Of the 7 fatal cases, 1 died in one hour, and 1 in forty-six hours, after the attack."—*Lancet*, March 26, 1859.

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12. *On "Ataxie Locomotrice Progressive."*—DR. DUCHENNE, of Bologne, under the above title, describes what he regards as a new disease. He states that for six years past his researches have induced him to believe in its existence, and that once having satisfied himself of the fact, he had no difficulty in discovering many instances of the disorder. Without making a minute search, he states that in a brief space of time he collected twenty cases. The charac-

[1] The Irritable Bladder; its Causes and Curative Treatment. By Frederick J. Gant, M. R. C. S., Surgeon to the Royal Free Hospital.

teristic features are: progressive abolition of the co-ordination of movements and apparent paralysis, contrasting with the persistent integrity of the muscular forces.

The loss of power of co-ordinating the movements which is manifested in the lower extremities, consists in a difficulty of maintaining an erect position without trembling or without support, or of performing certain movements in progression, such as lateral or gyratory movements. The patients commonly at such time feel giddy and as if about to lose their balance, and sometimes think that their lower extremities have lost power; the tactile sensibility of the sole of the foot becomes blunted or otherwise altered. They soon seem to be walking on soft substances when treading upon a pavement, or the ground appears to be elastic and to jerk them up. Subsequently they are unable to walk without throwing the legs forcibly forwards and striking the ground violently with the heel. These movements are at times so violent and sudden, that the body is shaken at every step, and that the patient loses the balance; this irregularity increases to such an extent as to render standing and walking almost impossible. It is then necessary to support the individual on both sides, and in attempting to make a few steps, their limbs are agitated in the most violent manner, without apparent object; the strength is speedily exhausted by these efforts, and the patient begs to be led back to his arm-chair. In this condition the patients pass their life, sitting or lying down. At the same time, with all these symptoms of paralysis, there is great force in individual movements, as shown by a dynamometer invented by Dr. Duchenne. The inquiry into the state of these movements must be made while the patient is sitting or standing; but it is more convenient to examine the lower extremities in the horizontal posture. The author first causes the patient to perform those movements which he proposes to study, then when the muscles which produce them are in a state of contraction and are maintained so by the patient, he acts upon the extremity of the member in question in the opposite sense to the movement performed, so as to support that part of the limb which serves as the attachment of the contracted muscles. For instance, in measuring the force of the extensors of the leg on the thigh, the patient lying on the opposite side, Dr. Duchenne has the thigh held very firmly at its inferior extremity, and whilst the patient tries to extend his leg forcibly, the Doctor acts upon it in the opposite direction, and applying the force at the level of the ankles, until he has produced flexion of the limbs. This the patient can do without fatigue; the dynamometer determines the force of the movement of extension employed by the individual experimented upon. A drawing of the instrument is annexed, but the exact method of its action is not explained.—*B. and F. Med.-Chirurg. Rev.*, April, 1859, from *Archives Gén. de Méd.*, Dec., 1859.

[A well-marked case of this affection, so graphically described by Dr. Duchenne, has fallen under our observation. The patient was a gentleman about sixty years of age, very robust, and a free liver. The right lower limb was most affected, and he complained that he could never tell when his right foot touched the ground, and locomotion became impossible. When raised up on his feet by the aid of two assistants, in order to enable him to make a few steps from his bed to a chair, his limbs trembled violently—he cried out that he would fall, and all power of supporting himself seemed to leave him. When placed in his chair, he became greatly agitated from the fear of falling, and he could not retain his seat unless a small table was placed before him. This table in reality afforded him but little support, but it always satisfied his mind, and on being placed before him his agitation promptly ceased.—Editor.]

13. *Treatment of Paralysis by the combined Aid of the Continuous Galvanic Current and Localized Galvanism.*—Mr. H. W. Lobb read a paper on this subject before the Harveian Society (March 3, 1859). He divided paralysis primarily into central and peripheric; in the former the disease is seated in the brain or cord, in the latter in the muscles themselves or the nerves supplying them. Localized galvanism affords a most admirable diagnostic of paralysis arising from disease in the cord. Upon its application to the affected muscles, if they readily contract, we know that the cord is healthy; whereas, if they do not con-

tract, the cord or muscles themselves are to blame. In rheumatic paralysis the muscles contract, causing severe pain; whereas in disease of the brain there is no pain upon contraction. The author then proceeded to give the notes of a case of *Rheumatic Paralysis of the Deltoid* of three months' duration, relieved the first day and cured the second. He stated that this was a common affection in both sexes after the fiftieth year, and that it usually easily gives way before the combined application of the continuous and interrupted galvanic currents. This affection was generally the result of cold or damp affecting primarily the cutaneous nerves; these, by reflection, give rise to a secondary injury to the motor nerves, probably setting up an inflammatory condition which, upon subsidence, leaves an inability to move without pain, and, in severe cases, inability to move at all. Friedberg, quoted by Ziemssen, has demonstrated in these affections atrophy of the arteries supplying the part. The author proceeded to the method of treatment, consisting of local Faradisation, together with the aid of the continuous current, the patient wearing a Pulvermacher chain. The next description of paralysis described was from long disuse and loss of muscular fibre, without central disease. *Partial Paralysis of Biceps and Triceps, from Injury and long Disuse.*—Lieutenant C., wounded before Delhi, June, 1857, by a shell, followed by fever and erysipelas. He was totally incapacitated from using the left arm, and had obtained two years' leave on full pay, with a certificate from the Medical Board, doubting his ever regaining the use of his arm. He was afraid, he said, to use the arm, lest he should drop anything, as he had no confidence in it; he was unable to ride on horseback, as he had no control over the animal; could not supinate the arm the least, or bend or straighten it with any power. Looking upon this case as one of paralysis from disuse, not from disease, Mr. Lobb promised him the perfect use of his arm in three weeks. A Pulvermacher chain of forty elements was applied, from the insertion of the deltoid to the outer condyle of the humerus, the position of the wound; direct current to promote circulation, and the interrupted current of the primary wire, was used daily for half an hour, exciting to contraction the paralyzed muscles. After the third day he was able to move his arm normally, although weakly; and at the end of a week he could raise a chair and hold it out at arms' length, and supine the arm with great force. This was a most satisfactory case, and astonished the operator, from the rapidity of the cure, almost as much as the patient. Mr. Lobb then related a case of infantile paralysis, caused by irritation during dentition, which had been under treatment for ten weeks with the most marked success; but, as the case was not complete, it is reserved for a future occasion. The fourth instance was a young lady, partially hemiplegic for seven years, who had undergone various forms of treatment without success; amongst others, she had been operated upon at the Orthopædic Hospital, with no benefit. The lower arm was completely paralyzed with contraction of the flexor muscles of the thumb and fingers. Electro-muscular contractility was speedily set up in all the affected muscles, but voluntary motion was tardy and very gradual; it commenced in the fingers, then the thumb, and lastly the supinators. She had voluntary power in all the paralyzed muscles in the course of six weeks, but the contraction is slow, and evidently the result of great and fatiguing efforts of the will; the muscles are now large and healthy, and with continued voluntary efforts will all return to their allegiance to the brain.—*Med. Times and Gaz.*, March 26, 1859.

14. *On the Indications for Blood-letting.*—Prof. SKODA, in the course of his clinical lectures, had occasion to make some remarks on the indications for blood-letting, of which the following is the substance: Venesection is only justifiable when, by a reduction of the quantity of the blood, dangerous contingencies, which have a distinct relation to the general mass of the blood, can be thereby removed. Inflammatory disease is of itself no indication, and equally valueless is the so-called nature of the fever—inflammatory, adynamic, etc. The condition of the pulse, as to strength and feebleness, is more the subjective idea of each individual physician, and cannot, therefore, be adopted as a directing indication for venesection. Real or apparent debility is a term conveying no more certain meaning, for the debility may be either muscular, mental, or merely

relates to the senses; while others include in the term diminution of the pulse or of the temperature. The remarkable observation, that the great muscular debility of many febrile diseases is often much lessened by bleeding, and which led to the supposition of a false debility, produced by oppression of the nerves, removable by blood-letting. But this fact is equally explicable by the consideration that muscular debility diminishes with the diminution of the fever, and this is equally striking whether venesection have been used or no. Only, blood-letting is a new loss, which must be added to that already caused by the febrile movement. Many people can withstand the loss of blood better than others; and there can be no doubt that a certain amount of blood may in some produce derangements only to be speedily removed by blood-letting. That, however, is but an individual case, and can no more be elevated to a general rule, than the similar fact that some individuals cannot bear in the smallest doses medicines which in others produce their beneficial effects only in very large ones. Accordingly, we may, in robust individuals, employ blood-letting even to allay certain symptoms not having a distinct connection with the amount of blood; but a favourable result in their case must never induce us to extend the practice to patients already anæmic, and such practice must be carefully avoided in diseases which tend to terminate in anæmia. Loss of blood will be borne well so long as sufficient remains for the nourishment of the organs. The inevitable alteration in the composition of the blood, consisting as it does chiefly in an increase of water, is speedily corrected by the secreting organs. Serious disturbances only present themselves in such as are incapable of replacing the blood lost, or in whom the loss goes on faster than is compatible with due nourishment. Venesections, performed from time to time, are often borne without detriment; how long this may be continued we cannot distinctly say. Blood-letting in acute inflammatory diseases, when not too frequently or too largely practised, have no influence in hastening or retarding the convalescence; this depending solely on the slower or more speedy return of the diseased organ to its normal state. The sole indication for blood-letting is, therefore, the necessity of subduing dangerous symptoms, whose occurrence has a determinate relation to the amount of blood, and exceptionally, in cases where experience has shown that troublesome symptoms may be thereby relieved; but in such cases the individuality of the patient must be carefully kept in mind. Venesection is always to be avoided in feeble persons, and in attacks which are apt to recur (as hysteria and hypochondria).—*Ed. Med. Journ.*, May, 1859, from *Prager Vtljschft.* 1859, Bd. i.

15. *Experiments relative to the Hypodermic Treatment of Disease.*—Mr. Charles Hunter related to the Western Medical and Surgical Society (April 1, 1859) some experiments on this subject, the object of which was to test the value of this plan of treatment, and to compare it with other modes of administering medicine. The author stated that he had in two cases of neuralgia to desist from Dr. Wood's plan, because abscess followed the constant localization; he was therefore induced to try the injection of parts distant from the neuralgic part. He found the greatest benefit follow this plan, and local inflammation was by this means avoided. Cases of neuralgia were cited showing how the injection of the cellular tissue (the tissue Mr. Hunter always injected) of any part would act rapidly upon and cure neuralgia in another part. Experiments were detailed which he had made to see whether these injections acted locally, or by being absorbed before they produced their effect. The conclusions were these: 1st. That they acted by absorption. 2d. That they acted quicker than the endermic method or stomachic doses. 3d. That they acted more effectually. 4th. that a small injected dose was equivalent to a much larger one by the stomach. Mr. Hunter then showed that for speedy action, which he supposed chiefly due to the rapidity of the absorption, this plan was superior to others. 1st. Where the immediate and decided effect of a sedative or narcotic was required. 2d. Where narcotics administered by the usual methods fail to do good; and 3d. Where patients cannot or refuse to take medicine.—*Med. Times & Gaz.*, April 23, 1859.

16. *Action of Chloride of Sodium upon Phthisis.*—Dr. R. P. Cotton has been experimenting, in the Consumption Hospital, Brompton, with various substances,

with a view of ascertaining their influence on the so-called tuberculous *crasis*. Among others, he has tried the chloride of sodium. "This substance was administered to twenty-five patients, thirteen of whom were males, and twelve females; their respective ages varying from 16 to 38, the majority being about midway between these two numbers. In seven cases the disease was either in the first stage, or the very commencement of the second; but in the rest there was distinct evidence either of tubercular softening or actual vomicæ. To the copious and accurate notes made by Dr. Maxwell, the resident Clinical Assistant at the hospital, I am chiefly indebted for the results of the trial.

"The salt was dissolved in water, and given in doses varying from one to three drachms, two or three times a day, the smaller quantity generally being prescribed at first, and gradually increased; a little compound tincture of lavender was added merely to disguise it. According to its effects, it was continued for a period varying, in the different cases, from two to eight weeks. It was found that one drachm could generally be taken without nausea; but in a few instances two drachms produced some degree of sickness, and three drachms caused vomiting, although, as a general rule, and in the majority of cases, these larger doses did not seem to disagree with the stomach. In two patients one drachm frequently gave rise to nausea, if taken upon an empty stomach, while two or even three drachms could be taken with impunity by the same person soon after meals.

"In fifteen cases the appetite either remained good, or became so during its administration; and in seven the appetite was either bad at first, or was lost under its use. In eight of these fifteen cases the increase of appetite was fairly attributable to the chloride; but in four out of the seven the salt was as fairly chargeable with its loss; thus showing the different effect of the chloride upon different individuals. In only three cases was thirst complained of, and this was generally remedied by freely diluting the solution.

"Fourteen patients visibly improved while the salt was being taken—such improvement consisting principally in the increase of strength and appetite, and the diminution of cough and other general symptoms; eight patients as visibly became worse in their general condition; and three seemed to remain in every respect unchanged.

"In four instances there was a manifest improvement in the physical signs; in six the pulmonary or local mischief as manifestly increased; and in fifteen there was no evidence of much change either one way or the other. It was singular that by far the greater number of cases of improvement, either in general symptoms or physical signs, occurred in the male sex.

"Thirteen of the patients increased in weight—the minimum increase being one pound, and the maximum six pounds; six lost weight—the greatest loss being three pounds, and the least one pound; and in six the weight remained as nearly as possible stationary.

"A large amount of chlorides was always found in the urine of those who were taking the salt; but so little in comparison with the quantity administered, that much must have either passed off by the bowels or remained in the system. No unusual amount of diarrhœa, however, attended its use. The search after chlorides lead to the discovery that the urine of all phthisical patients, even of those in the last stage of the disease, contains such compounds in considerable quantity.

"The remarkable circumstance, so often noticed in the treatment of phthisis, that while the general health and condition are apparently improving, the local disease is nevertheless advancing, presented itself in two well-marked instances.

"In estimating the effect of remedies, particularly in hospitals—and in none more so than that at Brompton—it is necessary to make proper allowance for the influence of concomitant circumstances. Improved diet, rest, hygiene, and hope, have a wondrous effect upon every kind of disease; but after carefully weighing the probable action of such agencies, I have arrived at the following conclusions, viz:—

"1. Chloride of sodium in some cases increases the appetite, and acts as a general tonic.

"2. In doses of one or two drachms gradually administered, it seldom produces either nausea or derangement of the digestive organs, or occasions any considerable degree of thirst.

"3. Its tonic influence in phthisis may fairly rank with many other tonics, such as bitters.

"4. It does not appear either that chloride of sodium is a substance deficient in the tuberculous crasis, or that it has any direct effect upon phthisis when fully developed."—*Med. Times & Gaz.*, May 28, 1859.

17. *Raw Meat in Diarrhœa.*—Our readers have, doubtless, not forgotten the interesting history of the two little twin daughters of a wealthy Mulhouse merchant, who had been reduced by unconquerable diarrhœa to the last gasp of life, and who, fed with the pulp of raw meat, returned, in a few months, to a state of perfect and robust health. Many facts have, since then, confirmed our confidence in the value of this Russian mode of treatment. Mr. Trousseau never allows an opportunity to escape of recommending it, and of pointing out the best manner of rendering it both useful and acceptable.

The meat best adapted to the purpose is the fillet of beef; some patients, however, prefer the centre part of mutton chops. It should be cut fine, pounded in a mortar, and strained through a sieve or cullender. The pulp, thus separated from the cellular texture of the muscular substance, is then gathered with a knife, and rolled in salt or powdered sugar, or mixed with currant-jam.

One of Mr. Trousseau's grandchildren would take it only when mixed with racahout, a farinaceous compound of cocoa, ground rice, and potato-flour, sweetened, and flavored with vanilla. Mr. Trousseau causes it sometimes to be rolled into small salted balls, of the size of a hazel-nut, or in little oblong gobbets, which may be administered in soup, to the number of thirty or forty, equivalent to four or five ounces of meat pulp. In grown persons, and particularly with ladies, the physician will probably meet with a repugnance, which he must overcome by concealing the repugnant character of the medication. For this purpose, some appearance of cocking may be imparted to the food, by exposing a thick slice of the meat, for twenty minutes, to the action of a brisk fire; its surface is thus roasted, the interior parts remaining raw, and being then treated as we have said. Mr. Trousseau has thus caused to be prepared by Mr. Mialhe (one of the principal apothecaries of Paris) meat-pulp combined with confection of roses, destined for delicate stomachs, which is taken without disgust, and even with pleasure, under the agreeable denomination of Damascene Preserve.

In children, the dose of raw meat, the first day, should not exceed 2½ dr. in four meals. It may be doubled on the second day, and on the third attain eight drachms; and so on, without any other additional food than albuminous water. It is easy to measure with precision the quantity administered daily, by means of a small balance and the current coins, the weight of which is well known—the franc being equivalent to one drachm, and the five-franc piece to six drachms. The dose may be carried as far as ten or twelve ounces, and the children gradually recover their good looks, their plumpness, and spirits. At the end of a month or six weeks, when diarrhœa has entirely ceased, the quantity of raw meat can be gradually decreased, and broth or underdone eggs can be substituted, so as to reduce the dose of meat to three or four ounces daily.

It is necessary to be aware that, at first, when already the nature and abundance of the diarrhœa has undergone a favourable change, the motions are red and fetid. In one of the little Mulhouse patients we above referred to, this animal diet appeared to have occasioned the development of tape-worm, a parasite commonly met with in Abyssinia, where the natives feed on raw meat; but this kind of nutriment not being so long persevered in, generally, as was the case in the instance of the little girl alluded to, this circumstance must be considered exceptional, and cannot counterbalance the decided benefits yielded by the Russian method of treatment, in cases of chronic disturbance of the bowels, and especially in the unconquerable diarrhœa which children are subject to in their second year.—*Dublin Hosp. Gaz.*, April 15, 1859, from *Journ. Pract. Med. and Surg.*, Paris.

18. *Retrospect on the Use of Raw Meat in the Diarrhœa of Weaned Children.* By Dr. J. F. WEISSE, Director of the Children's Hospital at St. Petersburgh.—Seventeen years have now elapsed since I first directed the attention of the profession to this invaluable remedy in the above disease[1]; but it was not until I had five years later treated of the subject at greater length[2], that it came into more general use. Soon after the publication of the latter paper, I received from the esteemed editor of the Journal just now quoted, Dr. Behrend, of Berlin, a letter containing the following passage: "You have no idea what interest your communication on diarrhœa ablactatorum and on the use of raw meat has excited; we now use the remedy extensively."

Not long after, Dr. Behrend inserted in the sixth volume of his Journal a letter of M. Marotte, Physician of the Central Bureau of the Parisian Hospitals, from which it appeared that this subject had attracted great attention also in the French metropolis. The author of this letter, which is addressed to Dr. Trousseau, has moreover had the kindness to suggest a theory explanatory of the results I have obtained. From this time the meat cure was generally received, and its utility admitted on all sides. Of the numerous favourable reports recently published, I cannot forbear literally transcribing that contributed by Dr. Eichelberg, because the author has given to the subject the appreciation it deserves. He says: "In consequence of the shortness of the time which has elapsed since this article of diet was first recommended. I have, it is true, only a limited number of observations (somewhat more than twenty) before me, but they all corroborate the remarkable advantages of the plan proposed. It is only in exceptional instances that such children refuse raw meat—the great majority, in fact, consume it with manifest relish. I have observed two very striking cases where the children for several weeks readily partook of this food with the most beneficial results, and at the end of that time suddenly refused it. Natural instinct seems in such examples to be unmistakable, as in the case of sick dogs, which eat grass. The want of osmazome made the children greedily consume the raw meat, but, with the cessation of the want, the desire for that principle disappeared."[3]

As Herr Eichelberg, moreover, has expressly indicated the diarrhœa which sets in soon after the weaning of children (according to my observations usually in two or three weeks after that event), as the affection in which the raw meat cure is attended with certain success, so I have also, in recommending this mode of treatment, confined myself to the same disease; and now, after nearly twenty years' experience, maintain, that raw, scraped beef, to the exclusion of all other medication, is a true specific in this destructive diarrhœa. I therefore consider a remark made by Charles Hogg, in recommending the well-known "beef-tea" of the English, to be quite erroneous. Thus he says: "Beef-tea is an excellent, nourishing, and easily digestible article of food, and completely replaces the juice of meat recommended by Weisse, of St. Petersburgh, obtained by scraping raw flesh."[4] I have in raw beef discovered, not an article of food for children, but a remedy against the diarrhœa in question; nor have I spoken of the juice to be obtained by scraping meat, but the muscular substance itself must be given to the children, having, however, previously been sufficiently comminuted, either by scraping with a knife, or by means of a grater, in order that it may be swallowed without trouble. But the principal point is, that the muscular substance itself, and not merely its juice, should be conveyed into the digestive tube. The English beef-tea has as little beneficial effect on diarrhœa ablactatorum as Liebig's excellent decoction of meat. Both these fluid aliments appear, precisely because they are fluid, to pass too quickly through the intestinal canal; while the meat in substance remains longer in the tube, and by its mechanical irritation may stimulate digestion, and it may, perhaps, also

[1] Oppenheim's Journal f. d. gesammte Medizin, Bd. xiii. page 393. Hamburgh, 1840.

[2] Journal f. Kinderkrankheiten, Bd. iv. pp. 99–104. Berlin, 1845.

[3] Ibid.

[4] Journal f. Kinderkrankheiten, Bd. xiv. p. 113, in the notice of Hogg's treatise "On the Management of Infancy," &c.

neutralize the acridity of the gastric juice. Nor can I participate in Dr. Beer's sanguine hope that raw grated beef may be destined one day to dislodge cod-liver oil from the Materia Medica.[1] Each of these excellent remedies has its definite sphere of medical action in the diseases of children; raw beef in the diarrhœa ablactatorum, cod-liver oil in rachitic affections, with and without atrophy.

In St. Petersburgh, the meat cure in the affection of children under consideration has become, so to speak, completely naturalized; and this has taken place rather through oral communication, and in consequence of the favourable results of the treatment, than from any paper or essay, as I have never published anything in that capital upon the subject. Most of my colleagues have now for several years made use of it, and they all assure me that they have obtained very satisfactory results, even in cases where the employment of other established remedies appeared to hold out no hope of cure. I have myself seen this treatment adopted in about two hundred children, and, in the majority, with the desired effect, provided recourse was had to it at the proper time. I say, at the proper time, for if the disease has already advanced too far, and, particularly, if it has assumed the form of the so-called gastro-malacia, it is only in exceptional instances that we shall obtain a cure. But even in this case there is no other remedy so calculated to allay the most tormenting symptoms, the tantalizing thirst, and the vomiting, as the raw beef. This beneficial effect is produced even after a few meals.

But it has recently been stated, as I have already publicly remarked,[2] that in many children saved by the meat cure, tape-worm, and it is worthy of note, always the tænia solium, that is precisely the species which is not indigenous in St. Petersburgh, has shown itself. A Dr. Braun[3] has felt himself called upon to question this statement; two years later, however, an undoubted authority on this subject appeared in favour of the facts reported by me. Professor D. Von Siebold, of Munich, says, in the last page of his interesting work, "Ueber die Band und Blasenwüemer," Leipsic, 1854: "We can no longer be surprised, or consider their statements fabulous, when physicians report that tape-worms have been found in certain patients after the use of raw meat prescribed as a remedy;" and in the note upon this passage he adds: Compare on this subject Weisse's communications, which, notwithstanding Braun's objections, are worthy of all credit." Herr Von Siebold directs particular attention to the fact that in every instance it was the tænia solium which was passed; and he considers it probable that this species of tape-worm, which is not indigenous in St. Petersburgh, may have been conveyed thither in the undeveloped state in the flesh of oxen, brought from Tscherkask and Podolia.

Only a few weeks before my departure from St. Petersburgh, in June of the present year, a tape-worm, more than four feet long, was sent to me by a colleague, to whom I had warmly recommended the meat cure in the case of a child, aged eighteen months, who had suffered from the diarrhœa in question, and was already very much run down, which worm was passed after the use of the ethereal oil of male fern. This remedy was administered in consequence of the child, who had long ceased to get the raw meat, and was cured of the diarrhœa, having repeatedly passed joints of tape-worm. The attendant physician had already correctly diagnosed the worm to be the tænia solium; I found that it was voided with the head, on which the suckers were plainly distinguishable under the microscope.

I should not omit to state, that in the Children's Hospital under my care, in the diarrhœas of older children, into which the element of dentition no longer enters, and which so largely contribute to fill the lists of mortality, raw meat has been repeatedly and unsuccessfully tried. These cases of diarrhœa generally depend upon ulcerations in the intestinal canal.

Lastly, I may be allowed to call the attention of the meeting to as palatable a remedy as raw beef, in the lientery of adults; I allude to oysters. In two

[1] Journal f. Kinderkrankheiten, Bd. xiv. p. 238.
[2] Ibid., Bd. xvi. p. 384. 1851.
[3] Ibid., Bd. xviii. p. 78, 1852: and in Froriep's Tagesberichten, 1852.

cases, an amount of experience, which, I must admit, goes for nothing, I saw the patients cured by the moderate use of these mollusca. From eight to twelve oysters were taken daily in two meals.—*Dublin Quart. Journ.*, Feb., 1858, from *Journ. für Kinderkrankheiten*, Jan. and Feb., 1858.

19. *Essential Oils in the Treatment of Puerperal Fever.*—It is well known that oil of turpentine has been used with advantage in some cases of puerperal fever. As this article is nauseous to some persons, and sometimes produces irritation of the kidneys and other unpleasant effects, Mr. H. DOVE, of Norwich, states (*British Medical Journal*, April 9) that he has been induced to try, in its stead, the essential oils, selecting that of peppermint, and giving thirty or forty minims in divided doses during the twenty-four hours. He has now used this oil in seven cases, and in another case, the oil of caraway, with all the advantages and none of the disadvantages of the turpentine. The dull colour of the complexion, œdematous condition of the surface, and offensive evacuations usually observed in puerperal fever, point out the necessity of commencing the treatment with at least one stimulating dose of aperient.

He relates the following case, which was the most severe of the eight in which he used the essential oils:—

"Mrs. G., a delicate woman aged 20, primipara, attended by a midwife, had an easy labour, and did well for four days; but on the fifth, she complained of chills, profuse perspirations, headache, intense thirst, vomiting and purging of offensive matters, and pain and distension of the abdomen. She was restless, her countenance was anxious, breathing short and hurried, tongue covered with a white fur, pulse 160; the lochia and urine were scanty; the skin was of dull colour and œdematous. A dose composed of tincture of rhubarb and castor oil, of each half an ounce, with five minims of the oil of peppermint in a little water, was immediately administered, and thirty minims of the oil of peppermint were given in divided doses, during the twenty-four hours. A spirit lotion was applied to the head, and mustard poultices to the abdomen.

"On the following day, the vomiting had ceased; the headache was relieved, and the pulse was considerably reduced. The purging, thirst, and perspirations continued for a few days and gradually ceased. In this case convalescence was slow, differing from the others, in which convalescence was remarkably rapid. Instead of the loathing usually expressed where turpentine has been used, there was an evident desire to take this oil, and, indeed, to continue it, when the necessity for it had ceased."

20. *Chloroform in the Treatment of Itch.*—Professor BACK reports the great advantage that has resulted from his treatment of itch by painting the surface with chloroform. Not only does the chloroform act beneficially by killing the acari, but by relieving the irritation of the skin which has been induced by scratching. The painting of even large surfaces was unattended with ill effects, and the temporary burning sensation produced was very supportable as compared with the itching which it superseded.—*Med. Times and Gaz.*, Jan. 15, 1859, from *Schmidt's Jahrb.*, No. xi.

21. *Herpes Zoster cured by Collodion.*—Mr. K. W. GODDARD relates (*Lancet*, Ap. 9, 1859) two cases of herpes zoster successfully treated by the application of collodion over the whole of the affected surface, with a camel's hair pencil. The application was repeated every twenty-four hours, and in four days the patients were cured.

22. *Obstinate Chronic Discharge from the Nostril removed by Extraction of a Carious Tooth.*—Mr. FLEISCHMANN, of Wrexham, relates (*British Medical Journal*, April 9, 1859) the following example of this: Miss Rose S., a little girl, aged 5 years, had been troubled for about three months with a constant, though not profuse, discharge of slightly purulent mucus from the right nostril; it appeared to be the sequel of a cold. The mucous membrane, so far as it could be examined, was healthy, and there were no indications of any morbid growth.

She was ordered a strong injection of gallic acid, and took concurrently small doses of the sesquichloride of iron. The only advantage she derived was, that the discharge lost its purulent character; in amount it remained the same, though the treatment was long persevered in, and other local astringents tried. I suspected that there must be some undiscovered local irritation. Not being able, on careful examination, to find anything wrong in the nasal passages, I looked to the condition of the teeth; and, finding the right upper canine carious, removed it. The discharge was much lessened on the next day; and, in the course of a day or two, disappeared altogether.

This short account may, perchance, afford a useful hint to some one; at any rate, it is a good illustration of reflected irritation, and teaches us that oftentimes the *fons et origo mali* is not just where we might expect to find it.

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23. *On Jerking Respiration* (*respiration saccadée*).—Dr. Bourgade is of opinion, and we think justly, that the profession have not paid sufficient attention to interrupted or jerking respiration, as one of the earliest symptoms of pulmonary tubercle. He details nine cases, and states that he has observed others, in which jerking respiration heard at the apex of one lung was the first auscultatory phenomenon indicating the deposition of tubercle subsequently proved by more palpable symptoms, and in part confirmed by post-mortem examination. In discussing the rationale of its production, he quotes one post-mortem examination, which absolutely disproves the views of Messrs. Barth and Roger on this point. They hold that it is due to the presence of the adhesions which are so frequently met with at the apex of the lungs in phthisical subjects. In the case in question there were no adhesions at the apex or about the middle of the lung in which the jerking respiration had been heard. It is to be remembered that the symptom is most commonly met with at a time when no evidence exists of preceding or accompanying pleurisy; the character of the sound and the structure of the parts in which it is found has always seemed to justify our attributing it to a partial constriction of the smaller bronchi owing to adjoining tubercles pressing upon them, the effort of inspiration causing the successive opening of the obstructed passages. We have met with cases in which spasm appeared to be the cause of the constriction; but we hold with Dr. Bourgade that, in the great majority of cases, jerking respiration is a sign of tubercular deposit.

We would indorse the following summary of observations made by Dr. Bourgade. Respiration is jerking when the respiratory murmur presents three or four brief intervals, and the ausculting ear experiences the sensation of a certain difficulty in the expansion of the pulmonary tissue from the prolonged expiratory murmur. The respiratory murmur otherwise preserves its normal timbre, and the symptom is chiefly observed during inspiration; it occurs, but less frequently, during expiration. This change in the respiratory murmur does not persist beyond a limited period; a prolonged expiratory murmur follows, or, more rarely, progressive diminution of the respiratory sound. This fact probably explains the circumstance of the symptom having been overlooked by many hospital physicians, who, seeing phthisis chiefly in its more advanced forms, do not meet with jerking respiration here as frequently as in private or extra-hospital practice. Jerking respiration is commonly limited to the apices of the lungs, which we should explain by the greater resistance of the parietes of these parts favouring the pressure of tubercle upon the adjoining bronchial tubes. When the patient is made to breathe more fully, the symptom is not rendered more palpable, but commonly disappears altogether. Jerking respiration is not always continuous, but at times presents regular intermissions; it may occur at every second, third, or fourth inspiration, sometimes even at greater intervals. It is chiefly at its first appearance that it presents this character, but when well marked it is commonly continuous; like other auscultatory phenomena, it may vary in strength and precision from day to day.

In concluding his paper, the author, though attributing much importance to jerking respiration as an early sign of pulmonary tubercle, states that he does not regard it as an absolute evidence of the deposit having taken place; for this

purpose he justly requires the presence of collateral, general, or local symptoms. —*Brit. and For. Med. Chir. Rev.*, April, 1859, from *Archives Gén. de. Méd.*, Nov., 1858.

24. *Diagnosis of Melanotic Cancer by the Urine.*—Dr. EISELT reports three cases, which appear to show that the urine offers a means of diagnosis in melanotic cancer. The first is that of a man, aged sixty, who, in 1856, came under observation with symptoms of hepatic cancer, and with cancer of the left eye. There was no icterus, but the urine exhibited a remarkable peculiarity; when passed it was perfectly clear, but on standing it became as dark as porter without losing its transparency. A portion was drawn by the catheter; it was found to contain copious uric acid, and a normal quantity of urea; when exposed to air and light it became dark in a few hours, but concentrated nitric acid caused the change instantly; other oxidizing substances, especially chromic acid, produced the same effect, and the black matter was regarded as melanin, which induced the opinion that the cancer was melanotic, a diagnosis confirmed by the autopsy. A year later a man, aged sixty-eight, was admitted into the Prague Hospital with cutaneous melanotic cancer. The urine at first exhibited the peculiarity shown in the last case feebly, but as the disease spread to the internal organs, and especially as the liver became affected, the reaction of the urine became as characteristic as in the former case. A third case occurred in May, 1858, in which there was hepatic cancer, and cancer of one eye. The urine again induced the attending physician to diagnose melanotic cancer; some urine of May 8th was closed hermetically and kept in the dark; some that was passed on May 9th was also closed hermetically and placed in the shade. On May 25th Dr. Eiselt exhibited both specimens to the College of Physicians of Prague; the urine of May 8th was slightly turbid, pale yellow, and had deposited phosphates; the urine of May 9th was black with reflected, and dark-brown with transmitted light. On opening the first specimen, nitric acid and chromic acid at once induced the black colour. The autopsy confirmed the diagnosis of melanotic cancer, for which there had been no other indication.—*B. and F. Med. Chir. Rev.*, April, 1859, from *Vierteljahrsschrift für die practische Heilkunde*, xv. Jahr., 1858.

25. *The after Effects of Diphtheria.*—Dr. FAURE, of Paris, has, in a series of cases collected from various sources, directed attention to a peculiar sequela of diphtheria, in which, some time after all trace of the original complaint has completely disappeared, the patient becomes, without known cause, pale and colourless, the limbs are much pained, the muscles lose their power, and he gradually sinks into a state of scarce imaginable debility. Sometimes one portion of the frame and sometimes another seems to suffer most. The legs can no longer carry the body; the arms lose their power; the soft palate dangles like a dead curtain; swallowing, and even breathing, becomes almost impossible; the pupils are dilated, and vision much impaired; sensation is dimininished and sometimes entirely lost, or replaced by formication. In some, sundry parts of the body become œdematous, in others gangrenous; others again are subject to repeated faintings. General reaction is not observable, fever rare, the skin in a certain degree moist. Reason flashes betimes through the gradually increasing dull stupidity, or a wandering smile may now and then light up the vacant countenance; and death finally closes the scene either by syncope, or as the last stage of exhaustion, like a gradual extinction of life. This affection has been referred to by Bretonneau, Trousseau, Blache, and others. Bretonneau regards these symptoms as the effect of a diphtheritic blood-poisoning. The most successful treatment has consisted in the administration of quinine and iron.—*Ed. Med. Journ.*, March, 1859.

26. *Dependence of Tape-Worm on the Use of Raw or Underdone Meat.*—The interesting discoveries of Von Siebold and of Küchenmeister, and their speculations as to the various modes in which the ova of intestinal worms enter the human body, induced Dr. J. BARCLAY, Physician to the Leicester Infirmary, to inquire of all his tape-worm patients, during the last twelve months, whether

they were fond of meat so underdone as to be a possible vehicle of the germs. In every one of the ten cases observed by him he ascertained that not only underdone, but really absolutely raw meat had been eaten. In some instances the fact was only elicited by cross-questioning, in others it was at once acknowledged. —*Med. Times and Gaz.*, March 26, 1859.

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27. *New Observation on Amyloid Degeneration.* By Rud. Virchow.—Among various causes of amyloid degeneration which occurred to our author, one in particular was signalized by the number of the organs affected, and also by the degeneration of several organs not hitherto known to be so affected. The case was that of an old woman long affected with Bright's disease, and who died dropsical. The liver, spleen, and both kidneys were much enlarged, and had undergone amyloid degeneration. The liver weighed 268.7, the spleen 473.8, the right kidney 230, and the left, 190.3 grm. The degeneration of the spleen was so general, that it looked and felt as if frozen. In the kidneys, the smaller arteries and glomeruli were chiefly affected. The liver-cells were unaffected, and the degeneration confined to the small vessels inside the acini. The intestines had an anæmic, transparent, pale gray, sodden appearance; and micro-chemical examination showed the vessels of the villi to be affected—the villi themselves patched with amyloid degeneration, which extended along the walls of the arteries deep into the submucous tissue, the chemical reaction becoming distinctly visible to the naked eye. The vaginal mucous membrane, the uterus, Fallopian tubes, and ovaries, were all affected. The uterus was enlarged, of a pale, yellowish-gray, translucent appearance; the amyloid degeneration was wholly confined to the organic muscular fibres, which formed large and distinct bundles, while the vascular and connective tissues were quite free. So that one form of hypertrophy of the uterus must be regarded as an amyloid degeneration thereof.

The muscles of the heart were similarly affected, but in a less degree; the cardiac function remaining comparatively unaffected, as evidenced by its cadaveric rigidity. Peri and endocardium were also affected; and even in the nerves, here and there between the fibres, round translucent masses seemed shoved in. In the lungs the same infiltration existed, not as a granular deposit, but as an uniform waxy deposit in the smaller vessels and the alveolar framework. Iodine and iodurettted sulphuric acid (Iod-Schwefelsäure) gave distinct reactions with these deposits; the slow action of the latter produced a blue coloration, which remained unaltered for six weeks.—*Ed. Med. Journ.*, from *Virchow's Archiv.*, Feb. 1857.

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28. *Anatomy of Cirrhosis.*—M. Sappey has communicated to the Imperial Academy of Medicine the results of investigations made by him with the view of determining the manner in which the blood of the portal vein reaches the inferior vena cava, when, from disease, the circulation through the liver is impeded. It is well known that in certain affections of this organ, and more particularly in cirrhosis, the capillaries become partly obliterated, and thus an obstacle is presented to the passage of the blood of the portal vein. The blood seeks a new passage, and without doubt it ultimately reaches the main current of the circulation. The question arises, through what vessels does the blood effect this new passage? In addressing himself to answer this question, M. Sappey examines the various opinions which have been expressed on this subject within the last few years, discusses them, and brings forward various facts and arguments from which he considers himself justified in drawing the following conclusions:—

1. There is no authentic instance of the persistence of the umbilical vein in the adult; and all the cases which have been considered as proving the persistence of the vessel, should be regarded, on the contrary, as so many examples of dilatation with hypertrophy of one of the small veins in the suspensory ligament of the liver.

2. This little vein, by undergoing dilatation and hypertrophic enlargement, produces dilatation and hypertrophy of the veins with which it anastomoses,

and becomes thus the starting-point of a channel of derivation which extends from the sinus of the portal vein towards the principal vein of the lower limb.

3. This derivative channel is traversed by the blood from above downwards, and not from below upwards, as all authors have hitherto taught.

4. It may follow either the veins situated beneath the aponeurosis or the abdominal subcutaneous veins. In the first case, neither varices nor varicose tumours are developed in its course; in the other, on the contrary, one or more of these tumours are generally produced.

5. The presence of the venous current from the liver to the crural vein is indicated by a *frémissement* perceptible to the hand, and by a stethoscopic murmur.

6. Lastly, the existence of this current may be considered, in the great majority of cases, as a symptom of cirrhosis of the liver; and while it always points to the cirrhosis as being of old standing and incurable, it should be regarded as a favorable sign, removing as it does any fear of abdominal dropsy.—*Edinburgh Medical Journal*, April, 1859.

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29. *Fibrous Tumour in the Left Auricle of the Heart.*—June 8, 1858, Mr. CASTILLO, student in the School of Medicine, presented to Drs. Rios, Odriozola, Villar, and ORNELLAS, a heart, which the last named gentleman describes.

Simple inspection shows it to be larger than natural, but softer and of normal colour. On opening its cavities, some small sanguineous coagula escape, and we are enabled to see that these cavities are somewhat dilated, but in other respects perfectly normal, except that of the left auricle. The walls of the ventricles are slightly attenuated, those of the left being thinnest. The columnæ carneæ present no peculiarities. The vascular orifices of the organ, their diameters, and valves are healthy.

In the cavity of the left auricle is a very large and very hard mass, filling at least three-fourths of its superior part. In size and weight it is comparable to a large sized hen-egg, and more or less decidedly cuboid in form, offering on its anterior and superior faces three or four deep fissures, which divide the mass into three principal lobes. The hardness of this tumour is very great; fibrous or cartilaginous in one part, less consistent in others, but no part can be broken by the hand.

The first lobule is the most voluminous; it is flattened, planiform, and twelve or fourteen millimetres in thickness. It is inserted by one of its large faces into the posterior wall of the auricle to the extent of eight or nine centimetres square. This lobule affords the chief points of insertion for the second, which, through the medium of the first, is attached to the auricular parietes. The consistence, hardness, and resistance of the first lobule are very great, but in these respects inferior to the second.

The second lobule, which approximates the first in size, inclines from below upwards upon its anterior face, and is two centimetres in length and breadth, and one in thickness. Its insertion is upon the inferior edge of the first lobule, and continuous with it. These two first lobules might be considered a single, hard, flattened tumour, doubled in two; one part of which adheres to the posterior wall of the auricle, and the other inclines from below upwards upon its anterior face. If the second lobule could have developed itself in the cavity of the auricle during life, it must have completely obstructed the left auriculo-ventricular orifice; but the anterior wall of the same auricle prevented this movement, which only became possible after division. This orifice was free from the tumour, whose nearest point of insertion was three or four centimetres distant from it.

The third lobule is entirely independent of the two first; it is inserted at the left of the first, between its corresponding edge and the orifices of the left pulmonary veins, with the lining membrane of which its external covering seems to be continuous. Its form is polypose, pediculate two or three centimetres long, and in its greater diameter, and is attached by its narrowest extremity. It is remarkable that this third lobule leaves the left pulmonary veins, which are so near to it, free. It has an appendix the size of a small filbert, situated between it and the second.

As already stated, the left pulmonary veins and auriculo-ventricular opening

are perfectly free. The same is true of the right pulmonary veins, which open about a centimetre distant from the right edge of the first lobule.

As to the structure of this tumour, the scalpel crepitates in it as when cutting cartilage, especially in the second lobule, and is throughout composed of a very dense fibrous texture; it presents bundles of fibres, especially distinct on the edge of the preparation. These bundles of fibres, extremely slender, filiform, are crossed by fibres equally slender, and mingled with innumerable elementary granules. Strong nitric acid renders the fibrillar structure more visible as it dissipates many of the granules, and the fibres become paler. Such is the structure of the second lobule, which is most dense, and in which a capillary arrangement can be perceived. The other lobules have the same structure, but with fewer granules and fibres than in the second lobule. The same may be said of the envelop of the tumour, which appears to be continuous with the endocardium, but no pavement epithelial cells could be discovered on its surface. The appearance of this fibrous texture is represented in fig. 3, plate xxiv., in Lebert's great work on pathological anatomy, to which the reader is referred.

The other pathological conditions of the case are described by Mr. Castillo, student, in a note addressed to Dr. Ornellas.

A large quantity of serum of a yellow tint, like that of ascites, was found in the peritoneal cavity. The liver, spleen, pancreas, and kidneys offered nothing remarkable, except that the spleen was harder and the left kidney larger than usual. The supra-renal capsules and ureters were normal, as were also the stomach and intestines. Some liquid was found in the pericardiac cavity (a half an ounce, more or less), and in the pleuræ. The large vessels in the vicinity of the heart were explored, but nothing observed. The cranium was not opened.

The heart above described belonged to Carnilo Bartholomé, a Frenchman, aged thirty-three years, of nervous temperament, feeble constitution, unmarried, and a carpenter by profession. This patient was in the clinical ward of Dr. Rios, in the Hospital San Andrés [Lima], from February 23, 1858, having been sick at home eight or ten months previously.

Drs. Rios and Villar had diagnosed hypertrophy of the heart, and had distinctly heard a bellows-sound in the systole, and in all the brief silence which was prolonged to the diastolic sound, which it totally masked, the sound being most pronounced at the base. Dr. Rios compared this sound to that of the firing of cannon at a distance.

After being in the hospital a month, Carnilo had hæmoptysis, which was successfully met by venesection; and afterwards he had anasarca, which began by œdema of the lower extremities, &c. In the course of his treatment, digitalis, the atrophic potion of Magendie, iodide of potassium, cicuta, acetate of lead for the hæmoptysis, &c., were administered. Applications of ice over the cardiac region afforded most relief to the strong impulses of the heart.

In the close, violent attacks of dyspnœa supervened, and increased the sufferings of the patient, in spite of the administration of belladonna, stramonium, and hyoscyamus: his sufferings were atrocious; his agony long and painful.

How explain the extensive bellows-sound in the systole and at the base, heard by the attending physician? Was it the mechanical pressure exerted by the left auricle dilated, which determined a temporary narrowness of the aorta and pulmonary artery, at the same time that the proper capacity of the auricle was diminished? How explain the development of this fibrous tumour in the cavity of the auricle? Was it hypertrophy of the fibrous and elastic coat of the endocardium that constituted it? Such an explanation does too much violence to the facts. In a word, everything shows that this tumour, developed in the posterior auricular wall, is of a fibrous nature—its form, consistence, hardness, resistance, its slow development, its slowness in determining death, from the circulation being more or less accustomed to its presence—are only explained by its fibrous nature, which the microscope has discovered. A fibrinous polypus would not present such physical characters, and its size would have caused death immediately after its formation.

The heart just described is highly curious, and its pathological condition extremely rare. We have been unable to find in our researches a similar case. It is true that Gluge, of Brussels, and Hodgkin, of London, have reported cases

of intra-auricular tumours, but have cited no one having the hardness and structure of this. Gluge has presented a most interesting case of a red tumour developed in the left auricle of the heart of a woman, aged fifty-two years. The cavity of the auricle was entirely occupied by the said tumour, which was enveloped in a proper and delicate membrane; and it had a great quantity of capillaries in its interior, constituting a reticular plexus. This tumour, which the Professor attributed to a sanguineous coagulum, is an instance of the highest organization of pathological tissues developed in the auricles we have been able to find. ORNELLAS, Lima. July 25, 1858.—*Gaceta Medica de Lima*, No. 46, August 7, 1858.—W. S. W. R.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

30. *Popliteal Aneurism successfully treated by flexion of the Knee-Joint.*—Mr. ERNEST HART related a case of this kind to the Royal Medical and Chirurgical Society (April 26, 1859), under the impression that they might be interested in the successful treatment of so formidable a disease as popliteal aneurism by the simple flexion of the knee-joint. J. S. aged forty-one years, consulted him in September, 1858, having a popliteal aneurism in the right ham. It was globular, of the size of a small apple, and situated at the lower and outer part of the popliteal space. It had a full beat, but was not very near the surface. Placing the patient on the sofa, and baring the leg in order to make a careful examination of the tumour, Mr. Hart found that its pulsation was affected by the angle at which the leg was bent upon the thigh, and that when very complete flexion was effected, its thrill almost wholly ceased. Concluding that in this position the course of the blood through the tumour was greatly retarded, he conceived the hope of effecting the cure of the aneurism by the deposition of active clots, if the leg could be retained for a sufficient length of time in the bent position. After a week's preliminary rest, treatment was commenced by bandaging the leg from the foot to the knee (not covering the tumour), thoroughly flexing the leg on the thigh, and retaining it in that position by the application of a stout roller. He was a thin, wiry man, and the flexion produced no inconvenience to him at the time. He passed a better night than during the previous week, when severe pain had been present in the aneurismal sac. What pain or annoyance was complained of during the treatment was referred to the knee-cap, but it was very trifling, and "barely deserving to be called pain." The tumour was examined on the morning of the third day (about forty hours after flexion was enforced), and considerable solidification had occurred. On the fifth day, the tumour was hard and solid, and neither pulsation nor thrill could be detected. The leg was lightly attached to the thigh at a right angle. On the seventh day, the patient was allowed to move about, the foot being slung. On the twelfth day, the leg was completely straightened, and the patient walked on it with ease, limping from stiffness at the knee-joint consequent upon confinement. Six weeks subsequently, the tumour was hard and firm, and much smaller. After three months, it was barely perceptible, and there was pulsation in that part of the artery. The patient was seen at various stages by the author's friends, Mr. White Cooper, Mr. Coulson, Mr. Holmes, of St. George's Hospital, Mr. Flower, of Middlesex Hospital, and Mr. Buxton Shillitoe. The treatment by flexion in this case was perfectly and immediately successful. It was unattended with any difficulties, it offered no inconveniences, and was not followed by any other than satisfactory results. The case, however, was one particularly well suited for the essay of such a plan of treatment. The patient was not stout, which renders flexion difficult; nor was he aged, which makes it painful. The tumour was of average size and of average prominence; when the knee was bent, the aneurismal sac was below the line of flexure. These he believed to be all favourable circumstances. Cure was evidently effected in this method by the retardation

of the current of blood, and the consequent deposition of active clots in the sac —the only manner in which satisfactory cures could be anticipated. This result was probably effected by the combined influences of pressure on the sac by the surrounding fascial and muscular tissues, and acute flexion of the artery. In so far as it was due to pressure, it appeared to be a return to the old method of treatment by direct pressure, but was free from the inconveniences of the screw and pad, which were open to the reproach of occasioning gangrene of the skin, rupture of the sac, and other accidents. Its simplicity and its success in this case appeared to strongly recommend it for further trial. If it were not always successful, there was not any other method free from the same objection; and there seemed reason to hope that the principle might admit of efficient application to a number of cases in which aneurismal tumours were developed opposite to the joints of the limbs.

Dr. Alex. Shaw also reported a case cured by the same method. The patient, aged 30, first perceived a pulsating tumour in the left ham a week before his admission into the Middlesex Hospital. It was of the size of a lemon, occupied the centre of the popliteal space; was easily compressed; the pulsation was strong, and there were other signs of its being a recent aneurism. On December 1, the knee was secured in the bent position by a band brought round the foot and thigh, and fixed near the hip. The immediate effect of the flexion was that the patient ceased to feel the beating of the tumour, and that on inserting the oiled finger into the flexure behind the knee no pulsation could be discerned. On the fourth day, when the limb was unbound, the tumour was found to have lost about a third of its original size; its walls were thicker and denser, the force of the pulsation was considerably diminished, and the sac had receded more deeply into the popliteal cavity. Gradual improvement continued to take place. Between the third and fourth week from the commencement of the treatment the sac had become greatly reduced in size; its walls appeared nearly solid, and the pulsation was so faint that it was expected at each day's visit to find it extinct. The treatment was varied by occasionally undoing the strap, which confined the knee, for several hours together; but, owing to the stiffness caused by the long continuance of the flexion, the position of the joint was not much altered by the relaxation. It was not till the thirty-eighth day that the pulsation in the tumour altogether ceased. The sac was at that time about the size of a walnut. The patient gradually recovered the power of extending the joint. On the fiftieth day he could walk with only a slight halt, and on the fifty-sixth day he was discharged. During the first ten days the patient complained of the pain, as well as the irksomeness, of keeping his knee constantly bent; and for a slight swelling of the joint a lead lotion was applied. Afterwards he made light of the inconvenience, and he never at any time asked to have the belt relaxed. At the close of the case, the author offered a few brief remarks on the principle on which the cure was effected; and, in illustration, added the observation that, by extreme flexion of the knee-joint of a sound limb, the force of the current of blood through the popliteal artery can be weakened to such a degree as to cause stoppage of pulsation in the tibial arteries.

Mr. Fergusson congratulated the authors on the success which had attended their efforts, and upon having made a very valuable addition to the practice of surgery. He thought the treatment of aneurism was greatly benefited by the application of pressure, and also by "manipulation," and which he anticipated would often obviate the necessity of resorting to the knife. Though there might be some failure in the cases detailed, that very circumstance should act as an encouragement to them to persevere in testing the value of the method recommended. The plan had been tried three or four years ago in King's College Hospital, where one of the house-surgeons had found in a case of popliteal aneurism, that pulsation in the tumour ceased during the flexion of the leg upon the thigh. The aneurism was of the size of the fist, and was treated by pressure on the groin, and flexure of the leg upon the thigh. No benefit, however, resulted from it, and the man becoming impatient of the treatment, went out of the hospital, and died of another disease. There was another case of aneurism in the popliteal space, in which pressure gave encouraging, but tardy results. In this case it was discovered that on extending the leg to its full degree, after pressure was employed, pulsation had entirely ceased.

31. *Manual Compression in the Treatment of Aneurism and Inflammation.*—VANZETTI, Professor of Clinical Surgery at Padua, observes, in a recent communication to the French Academy of Sciences, that although compression of the artery by the hand has occasionally been employed adjuvatory to other means of treating aneurism, yet this simple and natural method had never been proposed as the sole means of treatment, until he himself resorted to it. Since his visit to Dublin, in 1843, when he had the opportunity of observing the inconveniences attendant upon the production of compression by the aid of mechanical appliances, he has had in view the desirableness of substituting the action of the hand. It was not until 1853, however, that he first practically realized the idea. A mason presented himself with a popliteal aneurism the size of an orange, and after he had been prepared by rest, diet, and nitre drinks, he was taught how to compress the femoral artery, and was directed to do this several times in the day. At the end of a fortnight, the compression was kept up more methodically, being continued, at intervals, so as not to weary the patient, for at least two hours at a time. Solidification then took place at the end of forty-eight hours. The tumour disappeared rapidly, and the man has continued well since. The second case occurred in the person of an officer of the Chasseurs, the popliteal aneurism being as large as a lemon. Having employed occasional compression of the femoral at home at intervals during a month, he came to the Hospital, and then five hours' continuous compression, kept up by the pupils, secured solidification. He is now on duty in the army. Case 3. A woman, aged 38, was admitted into the Padua Clinic, with a frightful protrusion of the left eye, this having originally commenced during the throes of labour. As all the symptoms of aneurism of the ophthalmic artery were present, compression of the left carotid was put into force. The intervals were very short, for if continued for more than a minute the pressure produced faintness. After four days all sounds and pulsation had ceased, and a few days later the eye reassumed all its normal characters. 4. The next case was an aneurism at the bend of the elbow, under the care of Professor Gherini, of Milan; and manual compression of the brachial produced solidification in three and a half hours. 5. Dr. Gelmi, of Verona, treated a case of popliteal aneurism by means of pressure of the femoral, first for two or three hours, and then for one or two hours per diem; and by the twentieth day the leg had resumed its normal condition. 6. A patient came under Professor Riberi's care at Turin, with an aneurism at the lower third of the femoral, and which had ensued on a fall. Four hours' compression produced the necessary solidification. 7. In the case of a woman who suffered from protrusion of the eyeball, dependent on aneurism, compression was made on the carotid during five minutes five or six times in the twenty-four hours. On the seventeenth day, and after 440 minutes of compression, all appearance of projection had been removed. The reason that indirect manual compression has not excited earlier attention, as a means of treating aneurism, is probably the idea that it required very long continuance. The cases related, however, prove that the time is in reality very short, and the compression being employed intermittingly is attended with neither pain nor danger.

Encouraged by his success in the treatment of aneurism, Professor Vanzetti has resorted to manual compression in the case of inflammation of the limbs, whenever the artery has been accessible; and such success has attended its application to the femoral, brachial, and subclavian arteries in phlegmon and arthritis, that it now forms the ordinary means of treating such cases at the Padua Clinic whenever it is practicable. Employed promptly, it soon may arrest the progress of the inflammation, more time being required when the process has been set up during some period. In the case of severe or much advanced inflammation, although not of itself competent to effect a cure, it is the most powerful adjuvatory means. In the face of the great advantages derivable from this means we must not be deterred by apparent difficulties in the execution. Persons can be generally got to make the compression, or the patient may be taught to do this; and, in a case of great urgency, the surgeon himself should perform it for two or three hours. In general, compression need only be kept up for eight or ten minutes, and, after resting, again resumed. The Professor relates two cases as remarkable examples of the efficacy of this treatment; one

being an instance of a bad phlegmonous erysipelas of the arm, treated by compression of the subclavian; and the other a case of acute arthritis of the waist, treated by compression of the brachial.—*Comptes Rendus*, T. xlvii. pp. 471–5 and *L'Union Méd.* 1858, No. 58, No. 115.

The *Annali Universali de Medicina* for July, 1858, contains notes of two additional cases of aneurism of the ophthalmic artery treated by digital compression with success. One of these is related by Dr. Gioppi, Professor of Diseases of the Eye at Padua, and the other was communicated by Dr. Scaramuzza, of Verona, to Dr. Vanzetti, for publication. Dr. Vanzetti appends to the case the following summary of the general subject of digital compression: 1. The dominant principle of the treatment is that the compression should be complete and intermitting. 2. Complete compression when made by the finger is not painful. 3. Complete compression made during a given time produces an immensely greater effect than does incomplete compression continued for a like period. 4. Incomplete compression may, however, be resorted to when any local or general circumstances do not allow of its being made completely. 5. The compression may be intermittent, for being complete it is powerfully efficacious in effecting solidification, even when continued for a brief space of time at short intervals. 6. The person employing it should continue it until his hand has need of rest, and he should resume it when this has been obtained, discontinuing it during the night, in order that the patient should enjoy his sleep undisturbed. 7. The patient can compress for himself the femoral, radial, branchial, carotid, and frequently the subclavian, and can continue it for about five to eight minutes. 8. The rapid cures obtained by Gherini and Riberi by means of compression continued uninterruptedly for a few hours have not been attended with any accident. 9. The causes why an aneurismal tumour, which has ceased to pulsate after continuous compression for some hours, may, perhaps, as happens sometimes after the ligature, in place of solidifying, inflame, suppurate, or become gangrenous, are not as yet well known, and call for further study. 10. It is possible that the cruor does not become solidified, or softens in consequence of a pre-existing morbid condition of the sac, or owing to the disturbance of the capillary circulation of its parietes; and that the inflammation and subsequent gangrene of these may be the cause and not the effect of the successive changes in the coagulated cruor. 11. By the employment of complete and intermitting compression, the practitioner may cure his distant patient in two visits. At the first he teaches him how to make compression himself; and at the second visit, made two or three weeks afterwards, accompanied by an assistant, he makes complete and continuous compression during a few hours, which will suffice to complete the commenced solidification, if it be not already completed. 12. No application should be made to the limb, which must be laid in a comfortable position. Compression in certain cases sufficing alone, may in others be aided by Valsalva's preparatory treatment, which, if superfluous in many cases, may be highly necessary in others. In the *Annales d'Oculistique*, November, 1858, is a translation of an interesting paper by Professor Gioppi, of Padua, in which, after taking a survey of the present state of our knowledge concerning aneurism of the ophthalmic artery, he relates a case in which digital compression proved completely successful.—*Med. Times & Gaz.*, March 19th, 1859.

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32. *Treatment of Stricture of the Urethra.*—Mr. Wade lately read an instructive paper on this subject before the Medical Society of London. He said that it was well known that the means adopted by surgeons for the relief, or cure, of urethral stricture were usually classed under three heads: 1st, dilatation; 2d, the application of some escharotic substance to the diseased urethral tissues; 3d, division of the obstruction, either from within the urethral canal by some cutting instrument, as the lancetted catheter, or some one or other of a host of contrivances; or from without by external incision, now commonly called perineal section. Unaided, or simple dilatation was the method which, for a long time, had been principally relied upon by British surgeons for the relief, or cure, of urethral stricture. There was, he believed, no better mode of proceeding in a very large proportion of cases, and such had been its successful results,

that many very able surgeons had discountenanced every other mode of treatment. His own experience had long convinced him that the great error with regard to dilatation has been an attempt to do too much at a time, by which the disease had been aggravated instead of relieved. The urethra had, in fact, been but too frequently treated as if it were an inert, lifeless tube, instead of a living structure, possessing more or less exquisite sensitiveness. Mr. Wade then fully described the different kinds of dilatation, and the instruments commonly used in the different methods, and said he would not pass over, without comment, a kind of dilatation, to which the term "special" had been applied. Particular instruments of various kinds had been invented for the purpose of effecting dilatation more promptly than those in ordinary use. There were dilators of water, of mercury, and of air, which had been much lauded by their inventors. He had as yet no reason to believe these dilators to be preferable, or even comparable, to those in ordinary use, such as bougies, catheters, and sounds, which are much more manageable than the former. He must not omit to mention two modes of effecting prompt dilatation which had lately attracted considerable attention—those of Mr. Thos. Wakley and of Mr. Holt. The dilator of Mr. Holt was a modification of Perrève's instrument. Mr. Thos. Wakley's ingenious instruments were too well known to need description. From the strong testimony of their good effects which both these gentlemen had brought forward, it could not be doubted that in many cases these dilators might be used with advantage to the patient. Urethrotomy, or internal division of strictures by the lancetted catheter and other cutting instruments, had been but little practised in this country. In this method, division of the stricture was effected either from before backwards, or from behind forwards. Mr. Wade then described the various modes which had been resorted to by English and foreign surgeons to effect these objects. Perineal section, as described by Mr. Syme, was a "simple and easy mode of curing permanently the most difficult cases of urethral stricture, and unattended with danger to life." That "division of a stricture by external incision is sufficient for the complete remedy of the disease in its worst form; that in cases of less obstinacy, but still requiring the use of the bougie, division is preferable to dilatation, as affording relief more permanently and safely." From such a description from such high authority, it would not excite surprise that the new proceeding became for a time the fashion. No operation had probably been more fully tested than perineal section. That the sanguine expectations regarding the extraordinary efficiency of this operation entertained by Professor Syme should have ended in disappointment, was nothing more than had occurred with other remedial measures which had disappointed expectation. Long before Mr. Syme's adoption of perineal section, Sir Benjamin Brodie recommended the same operation in traumatic stricture, when the contraction would not yield to ordinary dilatation. Sir Benjamin observes "that in such cases a small staff is to be introduced into the bladder, and the cicatrix of the urethra divided from the perineum, a gum catheter being introduced afterwards, and allowed to remain until the wound is healed over it." That perineal section was neither a certain cure for urethral stricture, nor unattended with danger to life, was now well known. Much information regarding perineal section would be found in the treatises on Urethral Stricture by Professor Lizars and Mr. H. Smith.

Mr. Wade observed that the only method of treatment there remained for him to notice was that of the application of caustic to urethral strictures. It was almost superfluous for him to say that nitrate of silver and potassa fusa had, for a long time, been the only caustics employed for the relief, or cure, of such obstructions. Of the effects of the nitrate of silver in these affections, he had personally had but little experience, having for a long time entirely given up its use in such cases. Those, however, who desired information on this subject had only to read Sir Everard's Home's work on "Strictures of the Urethra." It might be questioned if the powers of any remedial agent were ever more fully and severely tested than those of the nitrate of silver by that eminent surgeon. To Mr. Whately, the contemporary of Sir E. Home, we were indebted for the introduction and strong recommendation of potassa fusa as a valuable therapeutic agent in urethral stricture. With regard to the employment of the caustic

alkali in this disease, it would be unnecessary for him to offer many observations, having so frequently recorded his high opinion of its extraordinary efficacy as to be looked upon as rather enthusiastic on the subject. Having for more than twenty-five years had constant opportunities of fully testing the powers of the potassa fusa, as an adjuvant in the dilatation, in the more obstinate forms of urethral stricture, he could truly state that every year's experience had increased his high estimation of its value. The effects of the nitrate of silver and of the potassa fusa did not admit of a comparison, as they were totally dissimilar; the former, when freely used, from its tendency to cause adhesive inflammation, often increases the urethral obstruction, whilst the remarkably solvent powers of the latter have no such effect. The effects of the alkaline caustic were, indeed, so strikingly superior to those of the nitrate of silver, that the preference which has generally been given to the latter was not easily to be accounted for. Mr. Wade, after having quoted some passages from Mr. Whately's work on Stricture, in illustration of the method of using the potassa fusa adopted by the latter, then briefly described that employed by himself. Mr. Wade rarely employed any other instrument for applying the potassa fusa to the stricture than the common wax bougie. The cases in which he had found the potassa fusa useful might be generally described as—1st, strictures having a cartilaginous hardness, impermeable as well as permeable; 2dly, strictures which bleed more or less freely on the introduction of the bougie; 3dly, irritable strictures. Time would not permit him to give cases in illustration of this method, or to enter further into details. Those, however, who were interested in the subject would find in his work on "Urethral Stricture" all the information it was in his power to afford. It would be seen that his views with regard to this method of treatment differ materially from those of Mr. Whately. He (Mr. Wade) did not use potassa fusa in all cases indiscriminately, but only in such as do not yield satisfactorily to dilatation. He had found it generally necessary to employ the caustic alkali in much larger quantities than Mr. Whately recommended, the minute portions used by him having produced scarcely any perceptible effect upon strictures, which, however, yielded to its more free application. But its greatest value was in impermeable strictures, to which Mr. Whately did not consider it applicable. These observations could not be considered as disrespectful to that able surgeon, as all improvements in our profession are progressive.

In concluding this part of his subject, it might be as well to state that the method of treating urethral stricture by potassa fusa was brought forward by him in a paper read at the Westminster Medical Society on the 15th of February, 1840. The testimony which from time to time he had published regarding its efficiency and safety had, he was happy to say, at length led to its employment by some of our best practical surgeons; and he entertained not the slightest doubt that the potassa fusa would, at no distant period, be regarded as one of the most valuable therapeutic agents in urethral stricture.

With regard to constitutional treatment, he would only observe that strict attention to the general health is as necessary in urethral stricture, as in other local affections of a more or less serious character; and that the surgeon will do well to bear in mind the principles inculcated in Mr. Abernethy's memorable "Observations on the Constitutional Origin and Treatment of Local Disease." In these days of "conservative surgery," it might be proper to ask how far the employment of caustic potash as a substitute for the knife may be regarded as entitled to any honour in this question. If an operation is the "opprobrium of surgery," any remedy which prevents the necessity of such operation is, at all events, "conservative." He (Mr. Wade) left others to determine how far the potassa fusa answers the purpose for which it is intended as a "conservative" agent.

The conclusions arrived at from the preceding remarks might be thus briefly summed up: That simple, unaided dilatation is the method which should commonly be adopted; and that it will, in the great majority of cases, succeed in affording satisfactory and permanent relief. There were, however, numerous cases in which the relief obtained by this method would be neither sufficient nor permanent; and in these the patient must depend, for any considerable improve-

ment in his condition, either on the application of caustic to his stricture, or on its division by some cutting instrument.

That internal section, when practised anterior to the bulb, is attended with but very slight risk; but when had recourse to for obstructions at the urethral curve, it has not unfrequently proved dangerous.

That external division, whether practised according to the old method, in impermeable, or that of Mr. Syme, in permeable stricture, from its disastrous results, is an operation justifiable only in the most urgent cases.

That Mr. Syme's operation will very seldom be required, it being only applicable to permeable obstructions; as every surgeon knows that after an instrument has been passed through a stricture, the greatest difficulty of the case ceases.

That in whatever manner a stricture may be divided, to preserve the opening made by its division, in most cases it will be necessary to have recourse to the regular use of the bougie, or other dilating instrument, for a considerable length of time afterwards.

That in intractable cases, as a general rule, he believed that the use of the potassa fusa would be attended with the most beneficial results; he was fully convinced of its being a perfectly safe proceeding.

In concluding these few brief comments on the treatment of urethral stricture, he could truly say that nothing but the knowledge that the employment of the potassa fusa in bad cases of stricture would in most instances prevent the necessity of resorting to operations attended with more or less danger, had induced him so perseveringly to bring before the profession his views with regard to its employment. He again recommended his professional brethren to give the potassa fusa a fair trial in the more intractable forms of urethral obstruction. It must be recollected, in recommendation of that plan of treatment, that it involved no danger; that it was impossible to do harm when properly applied; and that even should it be deemed necessary to resort to the knife, the surgeon would at least have the satisfaction of knowing that he had done all in his power to save the patient from a formidable, dangerous, or even fatal operation.—*Lancet*, May, 14, 1859.

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33. *New Mode of Relieving Retention of Urine.*—LANGSTON PARKER, Esq., Surgeon to Queen's Hospital, Birmingham, states (*British Med. Journ.*, May 21, 1859) that he has very recently succeeded, in two separate instances, in relieving retention of urine in the following manner:—

"A gentleman lately entered my consultation-room in great pain from retention of urine. He had not passed water for many hours; the bladder was much distended. He stated that ineffectual efforts had been made to pass a catheter, during which operations he had lost a considerable quantity of blood. I attempted to relieve him by the catheter, but failed to do so; I tried instruments of various sizes and various curves, but could not succeed in passing one into the bladder. I then took a No. 2 wax bougie, and inserted a small portion of potassa fusa into the end of it, after the manner proposed by Mr. Whateley, and practised by Mr. Wade, in the treatment of permanent stricture of the urethra. I well moulded the wax over all but the extreme point of the caustic, and passed it rapidly down to the point of obstruction; by pressing against this for a short time, it yielded, and I had the satisfaction of finding the bougie easily enter the bladder. I directed the patient to strain as I withdrew the instrument; a stream of urine followed, and the bladder was emptied. The retention did not again occur, and very little irritation accompanied or followed the proceeding. On the next day, the patient made water freely, but in a small stream.

"The second case was very similar. The patient had travelled some distance by rail. The bladder was much distended, the symptoms urgent, and a catheter could not be made to enter the bladder. A small wax bougie was armed as in the last case, passed down to the stricture, and firmly pressed against it. It yielded very shortly; the instrument entered the bladder, and a stream of urine followed its withdrawal. This patient had a second attack of retention two days afterwards, which was completely relieved in the same manner.

"A modification of this plan might be attempted by inserting a small piece of potassa fusa into the extreme point of a small gum-elastic catheter, and using it without the stilette. I am sanguine enough to hope that many cases of retention of urine might be easily and quickly relieved by the simple means I have suggested, and more formidable and dangerous operations thus frequently avoided."

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34. *Radical Cure of Hydrocele by the introduction of Iron Wire.*—Dr. F. B. Quinlan, Surgeon to St. Vincent's Hospital, relates (*Dublin Hospital Gazette*, April 1, 1859), the following case of hydrocele successfully treated by the method suggested recently by Dr. Simpson, of Edinburgh.

Joseph K., aged 60, of healthy appearance, a clerk, was admitted into St. Vincent's Hospital, on February 28th of the present year, labouring under hydrocele of the tunica vaginalis of the right testicle. He stated that about two years ago he had suffered from hydrocele on the left side, that he had been admitted into St. Vincent's Hospital under the care of the late Dr. Bellingham, who performed the operation for the radical cure by injection with tincture of iodine with complete success. He continued free from the disease until about nine months ago, when the right side of the scrotum began to swell, and gradually increased, until it had reached its present size (about as large as a small cocoa-nut). He was desirous of having this hydrocele radically cured; but begged that, if possible, the cure might be accomplished by some milder method, inasmuch as the former operation (by injection) had been attended with great pain and much subsequent inflammation. Dr. Q. accordingly determined to try the introduction of iron wire.

"*Tuesday, March* 1. I passed a Liston's nævus needle through the depending portion of the hydrocele; and into its eye, which had come out on the opposite side, I inserted four iron wires (No. 32). I withdrew the needle, carrying through, of course, the iron wires doubled; and in this manner left the hydrocele perforated by a species of seton composed of eight strands of iron wire. I then knotted the wire with a pair of twisting pliers, and placed a folded towel under the scrotum for the purpose of absorbing the fluid, which had begun to drain away immediately on the introduction of the wires. This drainage continued the whole day, so that by evening the hydrocele was almost completely empty.

2*d*. The hydrocele slightly inflamed. Ordered a tumbler of strong punch in the afternoon, and to walk for a short time about the ward.

3*d*. The hydrocele considerably inflamed. It has almost regained its former bulk.

4*th*. The hydrocele greatly swollen and inflamed. Slight tenderness up the spermatic cord. Patient a little feverish. The wire seton removed by simply cutting it across with a pair of scissors and drawing it out. The right testis carefully strapped with adhesive plaster, and supported in an upright position.

8*th*. The right side of the scrotum much diminished in size. No pain caused by pressure. The testis and tunica vaginalis are of stony hardness, not the slightest fluctuation being discernible. The strapping reapplied according as the scrotum decreased. The parts gradually regained their natural state. When the patient was discharged the testis was still surrounded by the hardened envelop of the obliterated tunica vaginalis, a condition which, in all probability, will not disappear for some time."

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35. *Epilepsy, in which Castration was performed.*—Mr. C. Holthouse read before the Royal Med. and Chir. Society (Mar. 22, 1859) an account of a remarkable case of epilepsy, in which he castrated the patient, an operation which has excited much interest and comment abroad, and which we cannot but consider as indefensible. The author commenced his paper by citing ten cases of epilepsy, in which castration is said to have cured the disease. In the first case, the testicles were removed in consequence of disease of those organs. In the second case, one testicle was removed on account of an accident to the organ. Both patients were epileptic previous to the affection of the testicles; and their removal, though not done with the view of curing the epilepsy, incidentally did so. These cases were related to Dr. M'Kinley, of Tennessee, U. S., by a Mr. M'Gavoc, of the

British Navy, and are published in the *American Med. Gaz.*, July, 1855, along with seven other cases in which castration was performed for the express purpose of curing epilepsy. Of these seven cases, two occurred in the practice of Dr. M'Kinley himself; two in the practice of Dr. White, of Tennessee; two in that of Dr. Talbot, of Missouri; and one in that of Dr. Hacker, of Louisiana. The tenth case occurred in Germany, the operation having been performed by Holz, under the direction of Joseph Frank, and it is recorded in the *Praxeos Medicæ Universæ Precepta*, vol. ii. chap. 11. Mr. Holthouse stated that he brought his case before the notice of the society partly because the operation was not attended with the same favourable results as in the cases referred to, and partly for the purpose of removing the misapprehension which prevails in reference to it. The case of the patient, very nearly as taken by Mr. Ponsonby K. Adair, the house-surgeon of the Westminster Hospital, was then read; after which the author proceeded to state the grounds on which he was induced to operate in the following words: "Reasons which induced me to operate.—1. The patient's urgent request. 2. The simple and dangerless character of the operation. 3. The knowledge that epilepsy had been cured by castration. 4. The possibility, if not probability, that it might be in the present case. Lastly, I was further influenced by a consideration of the history of the case, which showed, first, that every remedy hitherto tried had failed; and, secondly, that there was a close connection between the origin and severity of the fits and the condition of the sexual organs. Whatever weight may be attached to the 2d, 3d, and 4th reasons, I confess I should not have felt myself justified in recommending a proceeding of which I had no personal experience, nor any knowledge of the individuals who had adopted it; but although these considerations would not have sufficed to make me recommend the operation, they had their influence in inducing me to consent to its performance. It will be obvious, then, that I was chiefly influenced by the wishes of the patient. The question, therefore, arises, how far may a patient's wishes as respects treatment be acceded to, and on what points must a physician or surgeon satisfy himself before acting on a patient's suggestion? The following seem to me to be essential: 1st, he must satisfy himself that the patient is of mature age; 2dly, that he is of sound mind, not the subject of hallucinations or a monomaniac; 3dly, that his proposition is not unreasonable; and lastly, that the remedy proposed is not a dangerous one. Now, the only points on which I apprehend there can be any difference of opinion are—1st, as to the sanity of the patient; and 2dly, as to the reasonableness of the treatment adopted. I shall, therefore, address myself to these two points. And first, as to the sanity of the patient, it has been asserted by many that the mere fact of the man having had epilepsy for so long a period was presumptive evidence that his mind was unsound, and the pertinacity with which he begged to be castrated was considered a sufficient proof that this opinion was not unfounded. Mania, I was reminded, sometimes takes this form, and lunatics have been known to castrate themselves. Now, I am free to admit that if such a desire existed, or such a request were made on the part of any individual without adequate motive, there would be legitimate grounds for believing that he was insane, or at least, labouring under an insane delusion. But was there no adequate motive in the present case? What are the facts? The patient is walking in one of the streets of New York, when he is stopped by a physician of eminence and repute, the editor of a medical journal, who informs him he has just received a communication from one of his correspondents, in which castration is recommended for certain forms of epilepsy attended with great venereal excitement, and that nine cases had been successfully treated by this method. The letter containing this announcement Dr. Reese reads to him, and advises him to submit to the operation, at the same time offering him an introduction to Prof. Parker, Surgeon of the Bellevue Hospital, and Professor of Surgery at the University of New York, and one of the most eminent surgeons in that city. A consultation is held between Dr. Reese and Prof. Parker, when the latter, having been made acquainted with the history of the case, and had his attention called to the cases published in Dr. Reese's journal, consents to perform it, and is only deterred from doing so by the interposition of a medical relative of the patient, who was of opinion that no benefit would result. From this period is

to be dated the desire of the patient to be castrated; and believing that he had at last found a remedy for his disease, is it to be wondered at that he should be earnest and urgent in his desire to avail himself of it?—that he should prefer the positive evidence of those who had tried the remedy, to the negative evidence of those who had not—the practical experience of the former to the theoretical considerations of the latter? Moreover, when he called to mind the origin of his fits—their recurrence on his first marriage, after they had been absent for the two preceding years—their exacerbation on his second marriage, as well as under any sexual excitement—and his frequent nocturnal pollutions—could he dissociate the fits from the sexual organs? And was not the fact of his thus associating them a proof rather of his sanity than of his insanity? I appeal to the candour of the society whether there is the least analogy between a man desiring castration under such circumstances, and the morbid craving for mutilation of a madman? I would further remark, that the removal of the exciting cause of epilepsy, as indeed of any other disease, has been long recognized as the established rule of practice; and, although it is not always possible to determine what this cause may be, I hold it to be generally admitted that we are justified in acting on a fair presumption of the cause, though such presumption must necessarily fall short of actual proof. Acting on this presumption, epileptic patients have been subjected to the dangerous operation of trephining, sometimes with and sometimes without success. Acting on such presumption, Wardrop cured a case of eccentric epilepsy, by removing a joint of a healthy finger. Tissot relates a case where a similar good result followed amputation of the great toe. Dr. W. H. Edwards, of Virginia, U. S., cites another, in which the leg was amputated a few inches below the knee-joint; and several similar or analogous examples are on record. It must be obvious, then, that in all of these cases the epilepsy was of eccentric origin, and that the great nervous centres were only affected secondarily and sympathetically. Now the whole history of the patient whose case forms the subject of this paper, pointed to the abuse of the reproductive organs as the original source and the subsequent exciter of the epileptic paroxysms; indeed, the early abuse to which they had been subjected had so increased their functional activity that they were habitually in a state of abnormal excitement, and this reacting on the brain prevented that repose of the organ so favourable, if not essential, to its recovery, and constantly tended to counteract the effect of other remedial agents. But I am assuming here that the brain is affected; and indeed, in so long standing a case, it would be absurd to suppose that this organ was not in some measure damaged, although it may not have been originally the starting-point of the disease. I am aware it may be objected that the excitement of the genital organs was the effect and not the cause of disease of the brain, and that the origin both of the fits and of the sexual excitement must be referred to cerebral disorder. Now, though it may not be possible to prove the negative of this, there are so many facts which demonstrate the influence of the reproductive organs over the cerebral functions, that it is no unfair inference to suppose they may have thus acted in the present case. I hold, then, that the removal of all extrinsic sources of excitement from a disordered brain is both reasonable and proper; and believing, as from the history of the case I was entitled to do, that the reproductive organs of this patient did exercise an injurious influence on his brain—seeing, moreover, that precedents were not wanting where the removal of the testicles, under like circumstances, had been attended with success—I say, taking into consideration all these circumstances, I maintain that the request of the patient was not unreasonable, and that it was perfectly justifiable to accede to his wishes. The results of the operation are, so far as can be judged of at present, certainly not such as the patient anticipated: the fits continue to recur with much the same frequency, and are of a similar character."

Mr. Solly said he saw the patient in St. Thomas's Hospital, where a consultation was held, and Mr. Simon was inclined to yield to the man's wishes, against the general feelings of his colleagues. He (Mr. Solly) suggested, that if any operation was performed, the spermatic artery should be tied on one side, and if that proved in any way successful, a similar operation might be performed on the opposite side. His reason for making the suggestion was, that castration

was by no means a harmless operation, or unattended with danger. The last patient whom Mr. Green castrated died within a short time after the operation.

Mr. HOLMES COOTE said that the patient, having enjoyed the hospitalities of the public institutions in France and Germany, might now be seen any day in St. Bartholomew's walking about and airing himself, in the conscious dignity of having been castrated. It appeared to him that the man was a monomaniac. In an institution with which he was connected, Bethlehem Hospital, if all the operations were performed which the patients desired there would be a strange collection of individuals. One man desired to have his throat cut; another wished to be hung, and a third cut off his penis. In the case of a young woman subject to erotic monomania, a surgeon consented, at her request, to excise the clitoris, with the same effect as in Mr. Holthouse's case. The disease was really in the brain, and could only be relieved in an asylum under proper supervision.

Dr. SCHULHOFF stated that eunuchs in the east were found to suffer from epileptic fits.

Dr. WEBSTER had no doubt that Mr. Holthouse's patient was of unsound mind, and the circumstance of his strong desire to be castrated he regarded as a striking indication of that fact. He did not think the surgeon was justified in performing the operation simply because the patient requested it. The statements of the American cases, however, appeared to be sufficient to justify the operation. Long-standing epilepsy was generally accompanied with unsoundness of mind.

Mr. ACTON said there were many instances recorded of *operations de complaisance*, so that Mr. Holthouse was not without precedents for his justification. He hoped, however, that surgeons would be prevented from performing an operation of the kind detailed, seeing that the results were so unsatisfactory. He wondered that no one appeared to have suggested the cauterization of the urethra, which some persons considered useful in such affections.

Mr. HALE THOMPSON had seen the patient in Westminster Hospital, and had no doubt of his insanity. Had he heard of cauterization no doubt he would have proposed it. He had heard more false logic in the paper than he had ever heard in the society before; and he suggested whether it would not be better to follow the rules of practice laid down by eminent surgeons in this country, rather than adopt ill-understood American eccentricities. When the operation was performed he (Mr. Thompson) protested against it, the testicles being perfectly sound, and left the theatre rather than sanction by his presence such a proceeding. The operation was not without danger, and the man suffered fearfully from hemorrhage for two hours.

Dr. OGLE believed the man to be a monomaniac, and he had seen a letter from Paris respecting him, in which it was stated "the physicians think him stark mad." With regard to the experiments upon the lower animals, it was found that if they were castrated before puberty, their sexual desire was entirely destroyed, but this was not the case if the operation was performed at a later period. Cases were on record in which children had been begotten after castration, and it was known that some eunuchs had harems of their own; and it had been stated that a monarch of Persia, finding that the removal of the testes from eunuchs did not destroy desire, ordered that the entire organ should be removed. Juvenal, also, in his sixth satire, had a passage in which he showed that the women were in the habit of indulging themselves with eunuchs.—*Med. Times and Gaz.*, April 2, 1859.

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36. *Extraction from the Pharynx of a Needle which had penetrated the Neck.*—Mr. J. J. MURRAY relates (*Med. Times and Gazette*, May 7, 1859) the following case:—

M. B., aged 44, having been drinking, quarrelled with her husband, who was also intoxicated. In a scuffle which ensued, he roughly seized her by the throat and pushed her from him; and this push caused a needle, which had been used to fasten the woman's shawl, to penetrate the skin of the neck. The entrance of the needle caused acute pain, and she screamed loudly for assistance. A neighbour entered the room, and, on uncovering the neck, found that the needle

was so far imbedded in the tissues that only its eye could be seen projecting through the skin. Her friends having been unsuccessful in their endeavours to extract the foreign body, she came to the hospital about half an hour after the accident had occurred.

On examining the skin of the neck, the point at which the needle had entered was found to be distinctly indicated by a dark spot, situated on a level with the space between the lower margin of the cricoid cartilage and the first ring of the trachea, and about three-quarters of an inch to the right side of the mesial line. This spot was surrounded by slight redness and swelling, and exhibited tenderness on pressure.

The patient talked incessantly in a drunken, maudlin manner, and often complained loudly of lancinating pain in the region of the neck: but when requested to indicate the exact locality in which the pain was felt, she seemed quite unable to do so.

Relaxing the muscles by position, we carefully examined every portion of the neck by palpation, but no indication of the presence of the foreign body could be detected. The trachea and chest were carefully examined by the stethoscope, and the respiratory sounds were ascertained to be quite normal.

On the whole, then, we were disposed to believe that the case formed one of that numerous class in which the sensation remains after the foreign body has been removed. The woman was therefore recommended to return home for the night, and to revisit the hospital on the following morning. Previous to her dismissal, however, the forefinger was passed far down into the pharynx, and on the left side of the lower portion of its anterior wall, both Mr. Dewar and myself distinctly felt a thin, hard, wiry substance, which might be the missing needle. The exposed portion was felt to be about three-quarters of an inch in length; and by pressing on it with the finger-nail, was ascertained to have both its extremities firmly fixed in the adjacent tissues.

The long curved forceps, which are generally considered suitable for the removal of such bodies from the pharynx or œsophagus, were quickly procured, and with these means, Mr. Dewar and myself made repeated attempts at extraction. To seize a small piece of thin wire, lying close to the lower portion of the anterior wall of the pharynx, was an operation of considerable nicety; but the seizure was rendered much more uncertain and difficult by the unruly condition of the patient. Once and again a portion of the needle was fairly between the blades of the forceps, which were forthwith firmly closed; but, on attempting to extract the needle, the forceps lost their hold. From the flattened form and great length of the blades of the common œsophageal forceps, they seemed unfitted to grasp, with any degree of firmness, such a small body as that now under consideration. A long pair of curved forceps, with strong handles and comparatively short blades, were therefore procured, and, with them I was fortunate in seizing the needle, which was first freed at one extremity, and then extracted by a slightly wriggling movement. The offending body proved to be a stout sewing-needle, two inches in length; it was slightly curved when extracted, but was otherwise uninjured.

As I supposed that the irritation, caused by the presence of the foreign body, and also by the means used for its removal, might give rise to inflammatory swelling in the pharynx, I sent the patient to bed, and ordered small doses of tartrate of antimony to be administered to her at intervals during that night and next morning. Twenty-four hours after the extraction of the needle, she returned home, at her own request. During the four following days she had slight dysphagia, and pain on the larynx being pressed against the bodies of the cervical vertebræ. Since that time she has been in perfect health, and free from all uneasiness.

In this case it is evident that the foreign body, after having penetrated the skin of the neck, had been forced onwards towards the pharynx by muscular contraction. Had the needle remained undetected, or unextracted, it might possibly have been afterwards ejected by vomiting. But, from the manner of lodgment in the pharynx, it seems much more probable that, if interfered with, the needle would either, 1, have maintained its position; or, 2, have again found

its way to the surface; or, 3, have been conveyed into the stomach; or, 4, have penetrated the chest.

1stly. That the needle could not have remained long in the pharynx without considerable risk to the patient's life is sufficiently shown by a case related by Mr. Joseph Bell, of Barrhead. A lad of eighteen years of age swallowed a sewing-needle in his food; and though he afterwards suffered considerable uneasiness in the right side of his throat, the accident was not considered to be of a serious nature, till, on the ninth day, he began to spit up mouthfuls of blood. On the tenth day great hæmatemesis occurred, and the patient expired a few minutes afterwards. On examination, the larynx and trachea were found to be filled with clotted blood, but no abnormal opening could be detected in their walls. The stomach was distended with dark coagulated blood. The pharynx was found to be transfixed, opposite the middle of the thyroid cartilage, with a fine sewing-needle, three inches long. The point of the needle had caused ulceration of the coats of the common carotid artery; and, through the opening thus made, blood had passed along the course of the needle into the pharynx. Mr. Bell very properly remarks that the timely extraction of this needle would, in all probability, have saved the patient's life.

Had it been found impossible to extract the needle by the mouth, in the case which forms the subject of this paper, the hospital surgeons would have been called on to decide whether other operative proceedings were warrantable, or at all advisable. But I may remark that Sir Benjamin Brodie has cautioned the surgeon against the apparently easy operation of cutting down upon a needle in the tissues. He had found from experience that ordinary pressure or manipulation in a wound may cause the needle to change its position, to slip out of reach, and so render extraction impossible. And he contends that "no attempts should be made to take needles out of the human body until they are close to the surface, and when with a light hand they can be felt under the skin."

2dly. The needle might have again found its way to the surface of the body; for it is well known that metallic substances, such as needles and pins, have been safely expelled in this way, after having coursed through the tissues during a long period.

In August last I extracted from a girl's foot nearly the whole of a sewing-needle, which had been present in the tissues during three years and four months, without causing more than occasional uneasiness; and, under similar circumstances, I have since then repeatedly had occasion to extract from the tissues portions of needles or other metallic foreign bodies.

Mr. M. gives brief notices of a number of interesting cases of various foreign bodies in different parts of the body.

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37. *Fistula in Ano.*—Mr. J. R. LANE read recently an interesting paper on this disease, before the Western Med. and Surg. Society. After a description of his views of the situation and mode of formation of the different kinds of abscesses which are followed by fistula, he expressed his opinion that it was erroneous to suppose that abscesses in the neighbourhood of the anus were all but certain to give rise to this complaint. That the great majority did so was undoubtedly the case; but he thought that if early and free incisions were more generally practised, permanent closure of the cavity, especially in cases of acute abscess, would frequently take place. He had met with cases repeatedly in which he thought a fistula was inevitable, but in which the incision had, nevertheless, healed soundly and rapidly. Of the three varieties of fistula, the complete was the most common; the blind external was next in order of frequency, and the blind internal the most rare. Of 68 cases upon which he had operated in St. Mark's Hospital during the last eight months, 46 were complete, 20 were blind external, and 2 were blind internal. Sir B. Brodie had maintained that an internal aperture was always to be met with if sought for in the proper situation, and would not therefore admit the existence of an external blind fistula at all. In the 20 cases alluded to, however, no internal communication could be found after the most careful search, not only with the probe, but also by injecting fluid with a small syringe into the sinus, which method would frequently, by the passage of the fluid into the bowel, demonstrate the existence of a communica-

tion, even when it could not be discovered with the probe. In operating on these cases an artificial communication had been established either with the bistoury or the director in the usual way, and all had healed soundly and well—a result which would scarcely have taken place had an internal aperture existed, and had he failed to include it in the incision. The position of the internal aperture of a complete fistula was, as now generally understood, almost invariably placed just above the sphincter muscle, although the sinus itself might often extend some distance higher up. The author had only met with three exceptions to this rule, and in these he had found it placed two inches or more within the anal aperture. In the cases in which the internal aperture was in the usual situation, but the sinus extending higher up, he had always found it sufficient to lay open the lower part of the sinus through the internal communication into the rectum, without meddling with the upper part. He thought it advisable, however, in such a case always to have a free incision through the sphincter muscle, in order that there might be a ready outlet for any matter that continued to be secreted. In the exceptional cases, where the communication was placed higher up, it was, of course, essential to include it in the incision.

After some further remarks on the operation for fistula and its after treatment, Mr. Lane referred to the association of fistula with phthisis pulmonalis, which he believed had been over-estimated. M. Andral's statement, that he had examined 800 persons with phthisis, and only found one who had fistula, was well known, and the author believed that phthisis, by its debilitating influence, might conduce to abscess and fistula, and, on the other hand, that the drain from the latter might accelerate the development of tubercle in those predisposed to it. Whether an operation for fistula should be performed in phthisical persons, he decided in the affirmative; for in some half a dozen cases of this kind, not only did the wound heal favourably, but a decided improvement in the health of the patient resulted. It had been stated that an indurated condition of the internal aperture was a characteristic of fistula in phthisical persons. He did not believe it to be a sign which could at all be relied on, having seen fistulæ with a perfectly smooth condition of both external and internal apertures in persons suffering from phthisis, and also a highly callous condition of those apertures in persons in whom there was no suspicion of pulmonary disease.—*Lancet*, April 23, 1859.

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38. *Bismuth in Gleet and Leucorrhœa.*—M. Gaby states that repeated trials have convinced him that injections of oxide of bismuth constitute the very best treatment of *gleety discharges*. Thirty parts are suspended in 200 of rose-water, and so injected as to leave as large a deposit of the salt as possible in the canal. Three injections *per diem* should be employed at first, and then fewer. He has collected 43 cases thus treated with success, five of which he briefly relates. *Urethral discharges*, unconnected with gonorrhœa, as observed in certain diatheses, in masturbation, venereal excesses, etc., and increasing in quantity even after pure connection, have been treated by this means in three cases. *Balanitis* and *balano-posthitis*, and *herpes præputialis* yield rapidly to bismuth, applied in powder after cleansing the part, and then covering with cotton. The various forms of *vulvar leucorrhœa* may be treated with bismuth. One of these is entirely confined to the vulva, whether appearing as a consequence of follicular vulvitis or without preceding inflammatory symptoms. The latter is often met with in little girls. Pregnancy, want of cleanliness, masturbation, worms, or contusion, are among the exciting causes. After removing all complication the bismuth acts upon the discharge like a specific. In the leucorrhœa of girls, powdering with bismuth is an excellent remedy. In ordinary vaginal leucorrhœa, occurring in women otherwise healthy and having no other affection of the genito-urinary organs, the bismuth succeeds well. The cases of *urethra vaginal* leucorrhœa are almost always of infectious origin. They have in some instances yielded to bismuth when resisting obstinately other remedies. It is to be remembered that all the cases in which the bismuth is useful are of the chronic description; and that pain and other signs of acute inflammation contra-indicate its employment.—*Med. Times & Gaz.*, May 28th, 1859, from *Bull. de Thérap.*, tome lv.

39. *Ozæna.*—Mr. ROBERT DRUITT makes (*Med. Times and Gaz.*, Oct. 23, 1858), some interesting practical remarks on this intractable and very distressing affection.

"The most common origin of ozæna," he remarks, "is neglected catarrhal inflammation, in patients of scrofulous habit; and when once established, the bones may participate in the diseased condition. There is a peculiar appearance of the nose, a thickening and quasi-*romanizing* of the nasal bones, so that the upper part of the organ looks broad and prominent, whilst the lower part has a sort of pinched or twisted appearance, which characterizes the early victims of ozæna. Moreover, there is that terrible aspect of scrofula, which Cullen describes, the swelled columna and alæ nasi, and the swinish pouting of the upper lip, which are realized to the full only in case of scrofulous ozæna.

But an ulcer accidentally produced in a scrofulous patient, and which is hindered from getting well, is one thing; a true scrofulous ulcer, a local organ of elimination of scrofulous poison from the blood, is another thing; the one may be difficult to cure in a given number of weeks, the other too often sure, under any treatment whatever, to drag on for months or years. Yet, whatever may be the ultimate duration of the malady, its most painful feature, the smell, may be at once brought under control, and the same means which accomplish this also relieve other most troublesome symptoms, and expedite the entire recovery.

"The ordinary history the patient gives, is, that in addition to the constant effluvium and nauseous discharge, he passes at times portions greater or less of clot or fleshy matter; that there is increased stuffiness, and often very acute pain just before the accumulation of these things, and some relief, possibly some bleeding afterwards. The sense of smell is generally lost, although that of taste remains.

"These symptoms may all be mitigated at once, by the use of a large syringe or India-rubber bottle; by means of which the nose should be resolutely sluiced out with warm water, containing ever so little of Burnett's or Condy's deodorizing solution; and this should be repeated often enough—sometimes once a week, sometimes twice or three times—often enough to keep the cavity free from discharge, and to deodorize any decomposing surface.

"As auxiliary measures, the citrine ointment diluted, the vapour of creasote, and other astringents may be of use; and of course such constitutional remedies as may be adapted to relieve any existing cachexia. Bark and nitric acid are my favourite remedies; but the iodide of potassium, cod-liver oil, etc., have their uses.

"It must be borne in mind further, that these ulcers have their spontaneous periods of aggravation and subsidence, and that a gorged condition of the alimentary mucous membrane is a sure forerunner of mischief. Whenever, therefore, the health has been a little better, and the appetite keener than usual, and the veins fuller, then is the time to guard against fresh exudations, and to administer a gentle purgative."

Some cases of syphilitic ulceration are also attended with ozæna, which arises from just the same conditions as it does in the catarrhal and scrofulous varieties.

The sum of the matter, Mr. D. states, is this: "Ozæna is an accidental complication of any suppurating or ulcerative disease of the nose.

"It is the tendency of muco-pus to accumulate; and it is the tendency of the mucous membrane of the nose, if ulcerated, to exude flakes and clots of lymph or false membrane, which matters putrefy, and cause the smell.

"If these putrefying substances be washed away, and the cavity kept clean, there can be no smell; and this process carried out, as I have described it, makes the patient at once more comfortable, and conduces to the radical cure of the ulcer, no matter what the first origin of that ulcer may have been. The requisite constitutional measures should, of course, be used at the discretion of the practitioner."

The following case is related by Mr. D., to show what the local treatment should be.

"A young lady, aged 20, consulted me for an offensive discharge from the left nostril, of twelve months' duration. It followed a cold in the head, which had been unsually severe, and attended with much pain in the bones of the face.

Since that time she had been much infested with nauseous taste in the mouth, stuffiness and obstruction of the nostril, and profuse yellow offensive discharge, sometimes streaked with blood. The stench of her breath was most unbearable. There was no tenderness of the nose nor any other outward sign of disease. Her appetite was bad, and spirits low, inasmuch as she felt herself a nuisance to her friends, and her family doctor had pronounced the case one of disease of the bones, and had prescribed some zinc ointment, which had done no good.

"I immediately caused the affected nostril to be syringed by means of a large brass syringe, with warm water, to which a few drops of Condy's disinfecting fluid had been added. Several syringefuls were used without any effect or any decrease of the odour; but after persevering a little longer, the patient blew her nose, and expelled a small fragment of yellow putty-like stuff—consisting evidently of pus, in that state of decay to which the name yellow, or cheesy-tubercular matter is applied. The syringing was proceeded with, and in the course of half an hour the nostril was completely emptied of quite a large quantity of this yellow stuff, the fetor of which was so terrible that it clung to the clothes of those present for some hours. The result was, that the nostril was entirely freed from smell, and although there was great irritation, and the eye was rendered very vascular and swelled, the patient expressed herself greatly relieved, and quite comfortable by comparison.

"On the following day the irritation had subsided, and there had been no return of ill odour. There appeared some swelling and excoriation at the anterior extremity of the turbinated bone. A small quantity of very dilute citrine ointment was directed to be put up the nostril with a hair pencil every night.

"On the eighth day she called, and reported that there had been no return of the ill odour. This case is a good example of its kind; accumulation of mucopurulent matter, following catarrhal suppuration, and keeping up a diseased suppurating state of membrane by its presence."

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40. *A Contribution to the Statistics of Cancer, collected from the Records of the Middlesex Hospital.*—Septimus W. Sibley, Lecturer on Pathological Anatomy at the Middlesex Hospital, read an interesting paper before the Royal Medical and Chirurgical Society (March 8, 1859), in which he presented the result of an examination of 519 cases of cancer, together with the records of 172 post-mortem examinations. The more recent cases had been reported with uniformity and with some degree of fulness; some of the older cases were less perfect. In the first place the diseases embraced within the limits of the paper are defined, and what had been excluded from consideration. A table is then given, in which the seat of the primary cancer in each of the 519 cases is exhibited. There were 103 instances in the male, and 416 in the female; amongst the latter there were 191 of breast, and 156 of uterine cancer.

The ages of the patients are next stated. There were three examples under the age of ten (all males), and one between the age of ten and twenty. Tables are given, in which the ages are arranged in decennial periods, the cases of breast and of uterine cancer being placed in separate groups. The average age of those attacked with uterine cancer was 43.28 years; with breast cancer, 48.6.

Effect of marriage, pregnancy, &c.: Of the female cancer patients, 83 per cent. either were or had been married, and amongst the single women the disease occurred oftener in the breast than in the uterus. Of the married women, 86 per cent. of the uterine, and 74 per cent. of the patients with breast cancer, had borne children. The average number of the births was 5.2 among the former, and 3.89 among the latter. The interval between the last pregnancy, and the proportion attacked before and after the cessation of the catamenia, are also given.

The duration of life (from the first discovery of the disease), in patients who had not been operated on, varies greatly in the different classes of cases. In the breast it is 32¼ months; in the uterus, 14; in the stomach, 8½; in the rectum, 34; in the lip, face, &c., 53; in the penis, 34½; in the bones, 10; in the labium, 29. These figures are not perfectly comparable, as in some cases, especially the external cancers, the period given is the entire duration of the disease,

whilst in others (as in the stomach) the period is only that during which the symptoms were present.

An account is then given of the operations (by the knife) in cases of cancer of the breast. Three patients out of 60 died from the effects of the operation. The average duration of life of those who were operated on was 53.2 months. In comparing this with the duration of life in cases in which the disease was allowed to run its natural course (32.25 months), it should be remembered that the cases submitted to operation are more or less selected ones.

As to the hereditary nature of the affection, the difficulties in obtaining accurate information upon this point are first alluded to. The chief of these is the very imperfect knowledge which most people, but more especially hospital patients, possess of the diseases to which their relatives have been subject. Out of 305 cases, in which the point had been particularly inquired into, 34 patients remembered to have had a relation affected with cancer. A table is given of the seat of the disease in each of the 34 cases, in 17 of which the breast was the part affected. Tables are also given, in which the degree of relationship of the cancerous relative is shown, and also the proportion affected on the father's and on the mother's side. Out of the 34 cases, in six more than one relative was cancerous, and in one instance (the chief features of which are mentioned) no less than five relations suffered from cancer.

The existence of phthisis in different members of a cancerous family is also adverted to. This disease existed in 50 families out of 130. Similar tables to those before mentioned are given, in which the degree of kinship is exhibited; it being also noted whether the disease was on the father's or the mother's side.

The notes of the 172 post-mortem examinations are next analyzed. In the first place, a table is given, in which the seat of the primary cancer in each instance is exhibited. The cases are then arranged in the following groups: 1. Cancer of the breast. 2. Cancer of the uterus. 3. True cancer of other organs. 4. Epithelial cancer. A series of tables follows, in which the secondary cancers are enumerated, and the cases arranged as follows: *a*. The disease strictly local. *b*. Involving also the lymphatics of the part. *c*. Involving the lungs and other parts, the liver being unaffected. *d*. The liver cancerous, the lungs being free from this disease. *e*. Those cases in which there were tumours in distant parts of the body, but both the lungs and liver were free from the disease. Moreover, in each form of the affection, a list of the non-cancerous diseases found in the bodies of the cancer patients is appended.

The bearing of the foregoing facts on the mode in which cancer is disseminated throughout the body is next alluded to, three distinct modes of multiplication being recognized: 1st, the growth of tumours in the immediate neighbourhood of the cancer; 2d, the development of cancer in the lymphatics of the parts; 3d, the formation of cancerous tumours in distant parts of the body.

In regard to the cachexia, it was noticed that this condition only became developed as the ulceration and sloughing extended, and could not be attributed to pre-existing changes in the condition of the blood of the patient. In nearly all instances, the patient died from the ordinary effects of ulceration, or from the interference with vital functions.

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41. *Statistics of Lithotomy.*—Drs. JAS. A. LAWRIE and GEO. BUCHANAN publish (*Glasgow Medical Journal*, April, 1859) the statistics of lithotomy operations performed in the Glasgow Royal Infirmary since its foundation in 1795.

From the tables given, the following results are obtained:—

"Lithotomy has been performed in the male in 159 cases, with 23 deaths. Proportion of deaths to cases, 1 in 6.913.

The ages of the patients and results are as follows:—

At and under 5 years	50 cases.		3 deaths.
From 5 to 10 years	34 "		2 "
From 10 to 15 years	11 "		1 death.
In all under 15 years	95 "		6 deaths.

Proportion of deaths to cases under 15 years, 1 in 15.83.

From 15 to 20 years	14 cases.	5 deaths.
From 20 to 30 years	15 "	5 "
From 30 to 50 years	14 "	0
Above 50 years	14 "	3 "
In all above 15 years	57 "	13 "

Proportion of deaths to cases above 15 years, 1 in 4.384.

The ordinary lateral operation, in one or other of its modifications, has been performed 107 times, with 18 deaths. The operation with a rectangular staff, devised by Dr. A. Buchanan, has been performed 52 times, with 5 deaths. The following are the particulars of the cases which were treated by the two methods respectively:—

	The ordinary lateral operation occasionally modified to suit particular cases, as noted in the table.		Dr. A. Buchanan's Rectangular Method.	
At and under 5 years	28 cases.	1 death.	22 cases.	2 deaths.
From 5 to 10 years	24 "	1 "	10 "	1 death.
From 10 to 15 years	7 "	1 "	4 "	0
In all under 15 years	59 "	3 deaths.	36 "	3 deaths.
Proportion of deaths to cases,	1 in 19.6.		1 in 12.	
From 15 to 20 years	9 cases.	4 deaths.	5 cases.	1 death.
From 20 to 30 years	12 "	4 "	3 "	1 "
From 30 to 50 years	9 "	0 "	5 "	0 "
Above 50 years	11 "	3 "	3 "	0 "
In all above 15 years	41 "	11 "	16 "	2 deaths.

Proportion of deaths to cases above 15 years, 1 in 3.727; and by the rectangular method, 1 in 8.

In 7 additional cases of the lateral, the ages are omitted from the record; of these 4 died.

Proportion of deaths to total cases, lateral, 1 in 5.94; rectangular, 1 in 10.4.

It must be remarked that the above synoptical table does not give a true estimate of the relative success of the lateral and rectangular methods of operating. The column of 'lateral operations' ought rather to be entitled 'operations other than rectangular;' for a glance at the statistical tables will show that it includes various methods, even the old operation with the gorget. Of late years, however, it has always been performed with the curved staff and lithotomy knife; and in order to compare its success in this its simple form with the rectangular method, the most correct plan would be to take No. 211 in the table, and count back fifty-two cases, tabulating them as above; or, perhaps, a more exact estimate might be obtained by comparing equal numbers at the respective ages. This, however, is beyond the scope of the present paper, and probably the data are not sufficiently extended for too rigorous a comparison.

From the tables it appears that lithotrity has only been performed in 7 cases, and of these 3 died."

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42. *Causes of Death after Amputation.*—Thomas Bryant, Assistant-Surgeon, and Surgical Registrar to Guy's Hospital, read a paper on this subject before the Royal Med. and Chirurg. Soc. (Feb. 22d, 1859). The author, after having made a few preliminary observations, stated that his paper was based upon an analysis of 300 cases of amputation, collected from the records of Guy's Hospital. He had divided them into four classes; and although he had not thought it necessary to alter the ordinary division of traumatic amputations into primary and secondary, he had made some change in the division of the other forms; for it became evident, in the analysis, that the classing together of such cases as amputation for talipes, tumours, elephantiasis, deformity, and others of a like character, with those of diseases of the joints, a wrong result must en-

sue; and, practically, this was found to be the case. He therefore divided these cases into pathological amputations and amputations of expediency, choosing the latter term as more accurately expressing the reason for the operation, as limbs are removed for tumours, talipes, elephantiasis, and deformity, more from expediency than necessity; and he therefore suggested the use of such a term until a better was proposed.

The author then proceeded to an analysis of the table of amputations, including

167 cases of pathological amputations,
33 " amputation of expediency,
76 " primary amputations,
24 " secondary amputations;

and having given in detail the analysis of each division, he summed up the whole in the following general conclusions:—

1. That in amputations of the extremities, taken altogether, 25 per cent. are fatal; 30 per cent. in the lower extremity, and 10 per cent. in the upper.

2. That amputations, as a whole, are fatal in the following order: secondary, 50 per cent.; primary, 43 per cent.; amputations of expediency, 30 per cent.; pathological amputations, 12.5 per cent.

3. That in pathological amputations of the
Thigh, 18 per cent. are fatal, or 1 in 5.5;
Leg, 7.7 " " " 13;
Foot and upper extremity, success generally follows.

4. That in amputations of expediency of the
Thigh, 31.5 per cent. are fatal, or 1 case in 3.16;
Leg, 66.6 " " " 1.5;
Upper extremity, fatal cases are exceptional.

5. That in traumatic amputations of the lower extremity, 60 per cent. are fatal; of the upper, 18 per cent.; and that traumatic amputations of the leg are, at least, as fatal as those of the thigh.

6. That secondary amputations are more fatal than primary.

7. That in amputations of the thigh for chronic disease of the knee-joint, 1 case only out of 7 proves fatal,[1] or about 14.5 per cent.; but for acute suppuration, a fatal termination is the rule.

8. That in amputations of the lower extremity for tumours, 36 per cent. are fatal; of the upper, recovery may generally be expected.

The author then proceeded to the more immediate subject of the causes of death after amputations; and having given two tables, showing the different causes of death, and their proportions or percentages both to the fatal cases and the whole number of amputations, he went on to the analysis of each division, and having given a detailed account of each, he condensed the whole into the following conclusions:—

General Conclusions upon the Causes of Death in Amputations generally.—

1. That 25 per cent. are fatal.
30 per cent. of the lower extremity.
10 per cent. of the upper.

2. That pyæmia is the cause of death in 42 per cent. of the fatal cases, and in 10 per cent. of the whole number amputated.

3. That exhaustion is the cause of death in 33 per cent. of the fatal cases, and in 8 per cent. of the whole number amputated.

4. That the following causes of death are fatal in the annexed proportions:—

	Of fatal cases.	Of whole number.
Secondary hemorrhage	7 per cent.,	or 1.66 per cent.
Thoracic complications . . .	5.6 "	1.33 "
Cerebral "	3 "	.66 "
Abdominal "	1.4 "	.33 "
Renal "	3 "	.66 "
Hectic "	3 "	.66 "
Traumatic "	7 "	1.66 "

[1] The fatality of excision of the knee, according to Butcher, is at least 1 case in 5.

Pathological Amputations.—1. That pathological are by far the most successful amputations, 12.5 per cent. proving fatal. Such amputations of the upper extremity are generally followed by success. Of the lower extremity, 15 per cent. terminate fatally.

2. That pyæmia is the chief cause of death, proving fatal in 43 per cent. of the fatal cases, and in 5.4 per cent. of all pathological amputations; and when fatal, as a rule, it causes death within fourteen days of the operation.

3. That exhaustion, either from the shock of the accident or of the operation, from hemorrhage, or all three causes combined, is the cause in 33 per cent. of the fatal cases, or 4 per cent. of all amputations.

4. That secondary hemorrhage is the fatal cause in only 9 per cent. of the fatal cases, and in 1.4 per cent. of all amputations.

5. That hectic, abdominal, and thoracic complications act equally as causes of death in 13 per cent. of the fatal cases, and in 2 per cent. of all amputations.

Amputations of Expediency.—1. That 30 per cent. are fatal; but as amputations of the upper extremity are, as a rule, successful, the percentage of this operation upon the lower is much increased, 40 per cent. proving fatal.

2. That pyæmia is the chief cause of death, proving fatal in 60 per cent. of the fatal cases, and in 18 per cent. of all such amputations; and when fatal, as a rule, death takes place within fourteen days of the operation.

3. That death from exhaustion occurs in but 10 per cent. of the fatal cases; and that some thoracic or renal complication, or carcinomatous infiltration, are fatal causes in the same proportion.

Primary Amputations.—1. That 43 per cent. are fatal; 60 per cent. of the lower extremity, and 30 per cent. of the upper.

2. That primary amputations are more successful than secondary.

3. That pyæmia is the cause of death in 43 per. cent. of the fatal cases, and in 16 per cent. of the whole number, and that, when fatal, the symptoms appear, as a rule, between the seventh and fourteenth days after the operation, and cause death in the third or fourth week, and not during the first two weeks, as in pathological amputations and those of expediency.

4. That exhaustion is the cause of death in 32 per cent. of the fatal cases, and in 12 per cent. of the whole number.

5. That traumatic complications prove fatal in 15 per cent. of the fatal cases, and secondary hemorrhage, cerebral or thoracic complications, about 7 per cent. each; renal disease proving a cause of death in 3.5 per cent.

Secondary Amputations.—1. That 50 per cent. are fatal; 68 per cent. of the lower extremity, and 12.5 per cent. of the upper.

2. That secondary amputations are more fatal than primary, by about 8 per cent.

3. That exhaustion is the chief cause of death, proving the cause in 60 per cent. of the fatal cases.

4. That pyæmia is the cause in 25 per cent. of the fatal cases; secondary hemorrhage and hectic in the remaining 15 per cent.

Conclusions upon Pyæmia as a Cause of Death.—1. That it is the cause of death in 42 per cent. of all fatal cases of amputations, and in 10 per cent. of all amputations.

2. That it is the cause of death in the different forms of amputation in the following order:—

1. In 70 per cent. of all fatal amputations of expediency.
2. In 43 " " primary amputations.
3. In 43 " " pathological "
4. In 25 " " secondary "

and that in amputations of expediency it is the most frequent cause, and in secondary amputations the least.

3. That in amputations for acute suppuration of the knee-joint, whether the result of an abscess discharging into the joint or otherwise, pyæmia is a more frequent cause of death than in amputations for chronic disease.

4. That it is the general cause of death in amputations for talipes, elephantiasis, and tumours.

5. That in primary amputations, and in amputations of expediency of the leg, it is a more frequent cause of death than in the same operations upon the thigh.

6. That, upon the whole, pyæmia appears to be a more frequent cause of death in amputations through limbs the tissues of which are in a normal condition, and where a large surface of healthy bone is exposed.

7. That in pathological amputations, and in amputations of expediency, pyæmia, as a rule, proves fatal within fourteen days; but, after traumatic amputations, the period of death is about the twenty-fifth or twenty-sixth day.

General Conclusions upon Amputations of the Thigh.—1. That 27 per cent. are fatal.

Pathological amputations,	18	per cent.
Amputations of expediency,	31	"
Primary amputations,	60	"
Secondary "	75	"

2. That in amputations of the thigh for chronic diseases of the knee-joint, about 15 per cent. are fatal, or 1 case in 7.

3. That amputations of the thigh for acute suppuration in the joint are generally fatal; and that pyæmia is the chief cause of death in these cases.

4. That exhaustion and pyæmia are causes of death in equal proportions, or in about 40 per cent. of the fatal cases; and in 10 per cent. of all amputations of the thigh.

5. That exhaustion is most fatal in primary amputations, and the least so in amputations of expediency.

6. That pyæmia is most fatal in amputations of expediency, and the least so in primary.

7. That primary amputations are, for the most part, fatal from exhaustion; 35 per cent. of the cases sinking from this cause, 15 per cent. from pyæmia, and secondary hemorrhage and traumatic complications 5 per cent. each.

8. That exhaustion, pyæmia, and hectic are equally fatal causes in secondary amputations, proving fatal in 25 per cent. each.

Amputations of the Leg.—1. That 37 per cent. are fatal.

Pathological amputations,	7.7	per cent.
Amputations of expediency,	66.6	"
Primary amputations,	62.5	"
Secondary "	66.6	"

2. That amputations of the leg are 10 per cent. more fatal than of the thigh; the amputations of expediency and traumatic amputations being more fatal, and the latter more frequent.

3. That amputations of expediency of the leg are generally fatal, being twice as fatal as those of the thigh; that pyæmia is the chief cause of death in 75 per cent. of the fatal cases, and in 50 per cent. of all such amputations.

4. That in primary amputations, pyæmia is the cause of death in half the fatal cases, or in 32 per cent. of all such operations; exhaustion and visceral complications about 8 per cent. each.

5. That comparing primary amputations of the thigh and leg together, they are equally fatal; but that pyæmia is twice as fatal in amputations of the leg as in amputations of the thigh.

6. That half the cases of secondary amputations die from exhaustion; pyæmia and secondary hemorrhage being fatal in 8 per cent. each.

7. That taking all amputations of the leg together, 42 per cent. of the fatal cases die from pyæmia, and 32 per cent. from exhaustion.

Amputations of the Upper Extremity.—1. That 10 per cent. are fatal.

2. That pathological amputations and those of expediency are, as a rule, successful.

3. That about 20 per cent. of traumatic amputations are fatal; 22 per cent. of the arm, and 16 per cent. of the forearm.

4. That one-third of these fatal cases die from pyæmia; one-third from some traumatic complication; and the remaining third from secondary hemorrhage or visceral disease.—*Med. Times and Gaz.*, March, 5, 1859.

43. *Dislocation of the Shoulder Joint.*—Mr. T. Bryant, Assistant-Surgeon to Guy's Hospital, has published (*Med. Times & Gaz.*, May 14, 1859) some interesting remarks on this subject, based on 34 cases which have come under his observation. The following are his conclusions:—

1. The necessity to make an early and correct diagnosis.
2. That the head of the humerus may be dislocated in any position downwards, backwards, and forwards, these directions being the only possible ones into which the head can pass.
3. That dislocation downwards is by far the most common form; and dislocation backwards the least.
4. That a direct blow upon the shoulder is by far the most frequent cause of dislocation.
5. That dislocation of the humerus is more common in old people than in young and middle aged.
6. That it is most frequent in men.
7. That reduction is comparatively an easy task under the influence of chloroform.
8. That spasm of the muscles is not the principal impediment to the reduction of the bone; but that the lacerated capsular ligament may be regarded as the chief obstacle.
9. That simple extension with the heel in the axilla, when the patient is under the influence of chloroform, is generally sufficient to reduce the bone; in many cases the treatment by manipulation as described will be followed by success.
10. That up to six or seven weeks the chances of reduction may, as a rule, be considered good.
11. That reduction may be effected at any period after two months, but the chances of success are small.
12. That in old people, when the bone has been dislocated some weeks, and fair mobility exists, it is hardly expedient to attempt reduction.
13. That in old cases, and in others where reduction by extension or manipulation has failed, the treatment previously described of steady and constant pressure upon the head of the bone, by the adaptation of an air-pad to the axilla, should be employed; as being simple it can do no harm, and may succeed in other cases as well as in the example given.

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44. *A peculiar Vascular Tumour of the Rectum.*—Mr. R. Quain read before the Royal Med. and Chirurg. Society (May 24) a paper, the object of which was to describe and to discuss the nature of a tumour of the rectum, of which the author has found no account in books. The chief characters of the growth are its vascularity and the absence of hardness, the surface being studded over with thick papillary vascular prominences of various shape. These, in fact, form the chief and most characteristic part of the mass. The tumour had no connection, except with the mucous membrane of the bowel, from which it was an outgrowth. The author believes the disease not to be malignant, and he grounds his judgment upon the history of cases, upon a comparison with other cases, and upon the result of the examination of the structure of the tumours he removed in practice.

Mr. Spencer Wells alluded to the case of a female patient, similar to that recorded by Mr. Quain, which had been treated by him at the Samaritan Hospital. At first it was considered that there was stone in the bladder, but after careful examination, no calculus could be detected. There was a considerable loss of blood, some ounces being lost after every time she passed water. When the patient came under his care, he put her upon gallic acid; the bleeding diminished for a time, but came on again, and she became rapidly blanched, sinking into a dangerous condition from repeated loss of blood. He then employed a sponge-tent, in order to dilate the urethra; and on passing his finger into the bladder, he found a soft villous growth, about the size of a large strawberry. He cut it away with a pair of curved scissors; the symptoms were at once relieved, and the patient perfectly recovered. He had seen her lately, and there had been no relapse. He thought this bore out Mr. Quain's suggestion that the villous growth of the mucous membrane differed entirely from

those villous cancers described by Dr. Schuh, of Vienna. So far as he knew, the case he had alluded to was unique.

Mr. HENRY LEA witnessed a case some two or three years ago, which was very similar to that related by Mr. Spencer Wells. It was a case of hemorrhage from the bladder. After death, a villous projection was found growing at about half or three-quarters of an inch from the surface of the bladder, and having the terminal vessels ragged.

Dr. O'CONNER remembered a similar case to Mr. Quain's, in the Royal Free Hospital. The patient complained of a profuse discharge from the rectum; she was carefully examined, and a tumour was found within the rectum. It was successfully removed, and no return of the hemorrhage took place. He might add that no chloroform was administered, and that the tumour was removed with ease. The age of the patient was about 38 years.—*Med. Times & Gaz.*, June 4, 1859.

OPHTHALMOLOGY.

45. *Iodide of Potassium in the Treatment of Iritis.*—While some surgeons maintain that the iodide of potassium is altogether inefficient in the treatment of iritis, others with equal confidence assert that all cases of this affection may be perfectly cured by it.

J. C. WORDSWORTH, Esq., Assistant Surgeon to the Royal London Ophthalmic Hospital, has published (*Med. Times & Gaz.*, May 28th, 1859) some observations on this subject, which accord with the results of our own experience, and which appear to us to be well worthy of attention.

An extensive trial of iodide of potassium, has led him, he says, "to the conviction that a safe and speedy cure of iritis can generally be effected by it alone; but it must be admitted that instances occur, now and then, that resist its influence, and can only be subdued by the administration of mercury in addition. On the other hand, it may be safely stated that a combination of both will often accomplish a cure in less time, and at less sacrifice, than either mercury or iodide of potassium alone. I have known iritis occur when the patient has been under the specific action of mercury, and at once subside on giving the iodide of potassium. In other cases, the disease has appeared during a course of the iodide, and succumbed to mercury. I have, therefore, been led to adopt the plan of combining the two remedies, when I have found that either does not quickly produce the desired effect. It has occasionally happened that a considerable augmentation of pain has ensued on the use of the iodide; and in other instances, where it alone has been adopted, though all the other symptoms of the disease have rapidly subsided, the impairment of vision has continued for some time; under these circumstances, I have administered a few doses of mercury with decided advantage.

"As a matter of experience, as well as of theory, I should be indisposed to trust to the iodide alone, when the exudation exhibits a tendency to organization by assuming the nodular form, or by closing the pupil, and so leading to synechia or opaque capsule. Perhaps, too, as a rule, its sole use should not be adopted, if possible, when vision is from the outset of the attack much compromised.

"I have observed on many occasions a decided advantage follow its use, when the skin has quickly become affected by scaly or papular eruptions.

"On the other hand, it has seldom succeeded if there has been much prostration of strength or syphilitic cachexy; and in rheumatic iritis, bark and soda, or quinine will be generally more efficient, when the disease is associated with debility.

"In conclusion, then, I believe that the iodide of potassium cannot supersede mercury in the treatment of iritis, though it affords an excellent substitute in cases for which mercury is not admissible, either through some idiosyncrasy of the patient, or when the specific influence of the mineral has been already

attained; that in others, its combination with mercury will greatly expedite the recovery, and save the patient from the necessity of such a prolonged course of mercury as would seriously compromise the general health; and lastly, that in a large proportion of these cases the iodide will of itself suffice to effect a cure, especially when assisted by leeching and blisters."

46. *Sympathetic Inflammation of the Eye.*—Mr. Haynes Walton remarks (*Med. Times & Gaz.*, March 12, 1859) in regard to this condition that "If the direct inflammatory effects of the injury are quickly got over, the chances of the other eye ever suffering from irritation are immensely lessened. If inflammation lingers, many of the tunics are involved, pathological changes ensue, and the other eye is threatened.

"But what are the symptoms of dangerous sympathetic implication? Intolerance to light. Some form or other of impaired sight is the next bad omen. Loss of focal adjustment; incapability of sustaining the focus on minute objects; loss of definition, generally called feeble sight; abundance of muscæ, spectra flashes, stars, coruscations, pain, together with inflammatory action; loss of pupillary movements; a change of iris colour, and softening of eyeball are the later manifestations. The danger of sympathetic implication continues so long as the excitement produced by traumatic disease lingers, and the excitement may be so slight, and of such long duration, as likely to escape observation. A member of the Harveian Society, Mr. Wall, called me to a patient whose left eye was fast failing in the manner described, without any very apparent cause. The other eye had been wounded two years ago with a packing-needle, the cornea torn across, and sight destroyed. Occasional paroxysms of pain and tenderness under touch, convinced me that sympathetic disease was at work. I acted in the manner to be described with perfect success. The eye was completely restored.

"Drugs have no influence in removing or even checking the sympathy. Many eyes are sacrificed in abortive attempts with medicines. The traumatic disease must be subdued by removing the eyeball, or reducing it. Fortunately, the latter course will generally suffice, as the centre of the morbid action, or the intensity of it, is more commonly near the seat of injury, and therefore in front of the eyeball. When it is beyond this, for the most part indicated by general enlargement, or staphyloma scleroticæ, either the entire contents of the diseased globe must be evacuated, or extirpation adopted. I find it difficult to understand how it is, that the smallest quantity of pus, a drop or two just behind the cornea, or a slight change of texture of some of the tissues of the eye, can exert so baneful an effect."

In regard to the manner of operating, Mr. W. says as regards reductions, the principle should be always borne in mind, "that the less the eyeball is reduced, the less will be the deformity, and the better fitted the stump for an artificial eye, should one be desired. In more than two-thirds of the cases I have operated on, I have made my incision a line or two behind the cornea, whereby the iris, or whatever part of it remained, has been taken away. The eyelids having been retracted, transfix the cornea or the staphyloma corneæ, as it may be, with a cataract-needle or a curette, and make the incision with a small scalpel, as gently and rapidly as possible. Should the lens be present, whether opaque or not, I remove it. If I find the vitreous humor healthy, I try to prevent its escape by gentle manipulation and rapid closure of the eyelids, and sometimes none of it is lost. If it be otherwise, I would rather some did run away. What should follow is important. There is no more necessary step in the whole proceeding, and without it there may be copious bleeding and suppuration in the stump. Cotton, wool, or what is next best, a pledget of lint, should be quickly placed in the closed eyelids—maintained by a bandage, and kept on for two or three days. The more the eye generally is diseased, the quicker, and the more copious is likely to be the bleeding. The source of blood is not the central artery of the retina, as is generally supposed, but the vessels of the choroid. The stump heals by the cicatrizing of the cut surface, and its rapidity depends on the healthiness of the vitreous humor. It is not unusual to find it sealed up at the end of a week or ten days.

"I pass to the excision of the entire eyeball. I know that this is often unnecessarily done, when partial removal will suffice. I have been told that it is preferable solely because of the risk of bleeding that attends the other operation. I have shown how hemorrhage is to be entirely prevented; but let me inform you that in extirpation, I have seen bleeding from the ophthalmic artery that needed a firm compress to check. The distressing unsightliness that it occasions should deter one from resorting to it from choice. It renders the adjustment of an artificial eye difficult, and it is impossible that the false member can have the movements which are requisite to complete the counterfeit.

"As to the plan of executing it, the proper way is to remove the diseased eyeball alone, and not the other contents of the orbit, by dissecting it from its cellular sheath, as proposed almost simultaneously by Dr. O'Ferrall and Monsieur Bonnet. By it much bleeding is avoided, and the parietes of the orbit not being stripped, there is less chance of dangerous inflammation. The commissure of the eyelids is to be divided, although this is not always necessary, the conjunctiva cut through, the attachments of the recti and oblique muscles severed, and the scissors passed along the sheath of the eyeball, and the optic nerve divided."

When it is clearly ascertained that the wounded eye is decidedly lost, and that the secondary action, which is tolerably sure to be suppurative, is attended with pain and constitutional disturbance, Mr. W. judiciously advises that a portion of the eyeball be removed (a mere incision will not answer). or excision after Bonnet's plan be adopted. "Possessing," he remarks, "such means for safe and instantaneous relief, and by which besides, the greatest protection is afforded to the other eye, we ought not to allow a continuation of suffering and prostration which no other treatment will check, and which ceases only after certain consecutive morbid changes in the lost organ."

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47. *Foreign Body in the Vitreous Humour; Extraction; Recovery of the Eye.*—An exceedingly interesting and very unusual case has recently been treated by Mr. Dixon at the Ophthalmic Hospital, in which a foreign body was safely extracted from the centre of the vitreous chamber. Its details are briefly as follows:—

A healthy-looking man, aged 24, by trade a cooper, applied at the Hospital on the morning of December 2d, having just before received an injury to his left eye from a chip of steel, which broke off the edge of a chisel which he was using. A small wound, which had perforated the upper lid just above the margin of the tarsus, marked the spot where the metal had entered, and corresponding with this was one in the tarsal conjunctiva. There was a small gaping wound in the sclerotic. about a line distant from the uppper edge of the cornea. It thus seemed probable that the fragment had lodged itself within the globe. The pupil was active, and division nearly perfect. On examining with the ophthalmoscope, a clot of blood was distinctly seen hanging down from the wound, and waving to and fro behind the lens. Just below the optic entrance was a small round body, resembling a globule of clear lymph. As the foreign body had not been detected, no operation for its removal could of course be thought of. The eye was treated in the usual plan, being covered with cotton-wool, and lightly bandaged.

A week after the accident, on making a second examination with the ophthalmoscope, Mr. Dixon discovered the foreign body. It had evidently been concealed behind the iris, as it floated suddenly in view during a quick turn of the head. Having been once found, it was seen with the greatest ease, as well without the ophthalmoscope as with it. It hung, pendulum-like, almost in the axis of the eye, suspended by two or three threads of clot, which had their attachment to the cicatrix of the wound above. It moved from side to side with the greatest freedom.

The important question as to treatment now arose. The man's vision, despite the injury the globe had sustained, and the presence of a foreign body in its centre, was almost perfect. Could it be expected to remain so? Was it not probable that the immunity from inflammation hitherto observed was due to the position of the foreign body suspended in the middle of the vitreous and at a

distance from any sensitive structure? Was it not to be expected that the slender filaments, by which this immunity was secured, would before long give way? When they did so, and the bit of steel fell down on to the retina, would it not be certain to set up irritation? Taking all these circumstances into consideration, Mr. Dixon determined to at once attempt its extraction. Long examinations were made as to how best the foreign body could be kept in view, and finally it was decided to operate with the man sitting in a chair before a good light, the head being a little thrown back so as to let the object to be seized fall away from the lens. The lens, it must be borne in mind, was uninjured and perfectly transparent. The incision in the sclerotic was made below at a considerable distance from the cornea, and was large enough to allow of the free introduction of a pair of fine iris forceps of peculiar construction. The quantity of vitreous which escaped was not large. Some difficulty, owing to the impossibility of keeping the foreign body in sight, was experienced in seizing it, but at the third introduction of the forceps it was brought away in their grasp. It proved to be, as had been supposed, part of the edge of a chisel, and was a tenth of an inch long, and weighed a quarter of a grain. Immediately after its extraction the lids were closed with plaster.

No undue inflammation ensued on the operation, and the wound rapidly healed. The lens had not been injured, and retained its perfect transparency. A fortnight after the operation the man could see to read small type. About a month later, when an ophthalmoscopic examination was made, the deep structures of the eye were found to be perfectly healthy, and the only remnant of the effects of the accident was a single opaque filament floating in the vitreous.—*Med. Times & Gaz.*, March 26, 1859.

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48. *Mechanical Injuries to the Eyeball.*—Mr. Haynes Walton, in a recent paper (*Med. Times & Gaz.*, March 12, 1859) gives some judicious cautions against meddlesome examinations in cases of this kind.

"Effusion of blood," he remarks, "is the common consequence of a severe injury to the eyeball. It always exists when there is rupture of the external coats, and the danger of its presence is in proportion to the quantity effused in the posterior part of the eye.

"Adaptation as nearly as may be of divided parts—slight sustaining pressure—local and general rest—are the things indicated, and the objects to be accomplished. When I see a patient sufficiently soon after an injury, I make no further examination than is needed to ascertain its nature, to be assured of the line of action required, and to be able to form a tolerable prognosis. Taking care to exclude all extraneous substances, I close the eyelids, and retain them shut by one or two strips of court-plaster, which fulfils the first two indications—adaptation and slight sustaining pressure, with the great addition of excluding the atmosphere. When the accident is severe, I enjoin rest of body and disuse of the other eye. The quicker the union of the wound, the more certainly is the desired object gained, the more perfect the result, and the less the suffering.

"It is positively hurtful to apply stimulating lotions. Swelling of the conjunctiva, chemosis, as it is called, is the inevitable result of an injury, and readily passes away. The frequent use of cold water, or a cold lotion applied with a rag sufficiently thin to allow of evaporation, is most advantageous, and if much pain exist, the addition of some preparations of opium will generally afford relief. Sometimes warm applications are more grateful, so that the use of either must often be discretional.

"I resort now more frequently to the internal use of opium than in the earlier years of my practice, but I give it in very much smaller quantities, and repeat the dose often; so that although in the end I might prescribe as much, I am sure that I obtain a far better result. I affect the patient's system sufficiently, and keep it so influenced, without that knock-down prostrating result so likely to follow the large dose. I have met with cases in which nothing short of the local abstraction of blood would give ease.

"I learned in the operations for the extraction of cataract and for artificial pupil, how much is to be gained by not opening the eye for at least a week after it had been incised, and that knowledge I apply here. I am wholly unaware of

a single object that is to be gained by an earlier inspection, or one from day to day, as have been advocated by some surgeons. If matters are doing well it is not needed, and if any untoward events supervene, their existence is always manifested in appearances of the upper eyelid, and then it is, more than at any other period, that opening the eye is likely to be hurtful. Usually I do not remove the plaster for a week, and then I prefer that the patient should of his own accord, and after the tarsal margins have been duly cleansed, open the eye. The act is then devoid of suffering. The application of the surgeon's fingers is very apt, where there has been much lesion, to produce pain, and that often of long duration.

"But what is to be done when the iris is more or less prolapsed through the cornea, or perhaps through the sclerotica? The latter state is the more common. The sclerotica is more easily ruptured than the cornea, and the giving way is generally close to the attachment of one of the recti muscles. Most assuredly, as a rule, the less that is done the better. But very seldom, indeed, can it be necessary to interfere. I have a very few times thought it prudent, from the amount of the prolapse, from the very large bit that was hanging out, and to lessen irritation, to reduce the flap with a pair of scissors; but I repeat, that in general nothing of the kind is needed. By a natural and a safe process, whatever is superflous and not wanted in the progress of plugging and cicatrization is removed. The application of nitrate of silver cannot be beneficial. I know that it destroys primary cicatrization, and besides, increases inflammatory action, so that it is doubly hurtful. I say this after much investigation of the subject and a thorough conviction. In ulceration of the cornea the iris often protrudes in a bladder-like form, being pressed forwards by the aqueous humor. It is often advantageous to puncture the protrusion and produce collapse. I have not, so far as I remember, met with a parallel example from an injury.

"Constitutional treatment must not be neglected, and all measures likely to reduce chronic inflammatory action, I include even mercury carefully and judiciously given, must be adopted if a case calls for it."

Mr. W. properly cautions the surgeon not to let any extent of injury, short of actual collapse, destroy hope of restoring the eye to some degree of usefulness.

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49. *Cataract in Association with Diabetes.*—Mr. FRANCE relates (*Ophthalmological Hospital Reports*, Jan., 1859) the following cases, with a view of directing the attention of the profession to a complication and apparently a cause of cataract, but cursorily alluded to by authors.

Some years ago, while Dr. Babington was one of the medical staff of Guy's Hospital, a patient, about middle age, was admitted under his care for diabetes; and was undergoing treatment for that complaint when attention was drawn, in a fresh direction, by the failure of the man's sight. I was consequently requested to see him; and upon examining the organs of vision found that opacity had, without assignable cause, arisen simultaneously in both crystalline lenses, the capsules remaining clear. The cataracts were evidently soft, as indicated not only by their rapid formation, but also by their large bulk, and irregularly opalescent aspect.

This was the first case of cataract, in the peculiar relation in question, which I had encountered; and considering the extinction of useful vision, the probably indefinite duration of the urinary malady, the fair state of general health in other respects, and the opportunity of repose which a residence in hospital afforded, I was induced to recommend operation, and performed keratonyxis accordingly. No benefit, however, accrued; the corneal puncture remained unhealed, and fistulous for a long time; the aqueous humour, draining away as soon as secreted, could not act as a solvent on the lenticular substance; and hence, although the attempted remedy did not awaken any active inflammation, no diminution of the cataracts, and no improvement of vision resulted up to the time when the patient quitted the hospital and was lost sight of. The case could scarcely be quoted as an infraction of the fundamental law of physic *saltem non nocere;* still, in the most favourable point of view, the issue was negative, and taught distinctly enough the necessity of great caution in the treatment of similar cases.

The next example which I have to adduce was not under my own care; it enforces still more strongly the lesson derived from the preceding case.

Rebecca F., aged 48, came within my observation in May, 1845. She was a thin, feeble person, who had been suffering from diabetes for some time; the specific gravity of her urine was 1045. Both eyes were affected with cataract, and had been much in the same condition for four months previously. The opacity was principally, but not exclusively, seated in the deeper strata of the crystalline on each side; and consequently, from the natural colouration of that body at this age, presented an amber tint, imparted by the more transparent layers in front. The capsules were healthy, the pupils active, and the degree of vision quite proportionate to the remaining permeability of the lenses to light. The right cataract, which was the more advanced, was selected for operation; and the surgeon, perhaps mistaking its yellowish colour for an indication of hardness, pierced the sclerotic for the purpose of depression. This, however, proving impracticable—for the needle passed freely through the soft texture of the lens—the point of the instrument was brought forward through the pupil, the capsule opened, and the cataract freely divided. One operation sufficed; but not for cure. My last note, taken two months afterwards, states that the iris had become universally adherent, and the pupil contracted, and blocked up.

The next case occurred in the clinical ward of Guy's, from the records of which it is abridged; and the medical features and history are in consequence more fully detailed than in either of the preceding instances.

Harriet B., aged 19, a domestic servant, of fair complexion, light-brown hair, and blue eyes, living at Southampton, was admitted under the care of Dr. Addison, on October 11, 1854.

Up to two years previously she had enjoyed good health, and was a stout hearty girl; but about that time she caught a severe cold from exposure in washing, and was compelled to quit her situation exceedingly ill. Shortly after this she first began to pass large quantities of urine. The catamenia had been established when she was fifteen years of age, and had continued regular up to the period of her illness, but had not appeared since. She was free from chest affection, and of a healthy family.

On her admission into the hospital there was found extreme emaciation of the whole body; the skin was hot and dry; she experienced great thirst, voracious appetite, and frequent swelling of the legs. There was a slight hectic flush on either cheek. The pulse was small, but regular, 104; the tongue red, moist, tolerably clean, but fissured; and the gums were spongy.

The pupils of the eyes were dilated and indolent. Vision had become impaired for the last three or four months, and had progressively deteriorated; so that she was now unable to work at her needle by candlelight or bright daylight. The urine averaged from about a gallon to a gallon and a half per diem; was of a pale colour, peculiar sweet odour, not albuminous, of a specific gravity 1032, and contained a large quantity of sugar.

Mr. France, by request of Dr. Addison, examined the patient's eyes on October 17th, and found both pupils dilated and inactive. They were occupied by large, irregularly opalescent, cataracts; which, by their great bulk, protruded the irides in a convex form, and seemed to impede their motions by direct mechanical pressure.

The patient remained in hospital some months, on account of the diabetes; but eventually left of her own accord, as the report states, unimproved. The cataracts, in the meantime, became more completely opaque, and all useful vision at last extinguished. Palliative treatment only, by belladonna collyria, was adopted for the ocular affection.

The last case I have to narrate, in illustration of the present subject, occurred among my own out-patients at Guy's. The existence of the parent disease, diabetes, was not intimated by the patient; it was only ascertained upon special inquiry, prompted by the resemblance which struck me, between the aspect of the cataracts in this individual and that presented by the cases of the same complication which I had previously witnessed. The woman merely applied for relief to her failing sight; but upon the verification of my suspicion, the following account was kindly taken by our late house-surgeon, Mr. McDougal:—

Martha A., aged 30, a print colourer, of fair complexion, residing in Walworth, became an out-patient, under the care of Mr. France, on the 19th of June, 1857. She was married; had had four children, and had habitually enjoyed moderately good health, with the exception of occasional attacks of rheumatism. Her family were in general healthy, and there was no evidence of a syphilitic taint. About four years previously to her application at Guy's, and three months after the birth of her last child, she had had rheumatic fever, and subsequently began to suffer from extreme languor and debility, feverishness, pain in the back, cramp in the legs, and swelling of the lower extremities.

She was troubled with an abundant secretion of urine, and frequent micturition; her appetite and thirst became inordinate, and the former perverted. About eighteen months before admission the catamenia ceased entirely; and the cutaneous surface, which had usually been moist and perspirable, now became continuously dry and parched. The thirst and voracity of appetite increased; her tongue became arid and cracked, the fauces dry, the teeth were gradually eroded and broke off; she suffered from palpitation and faintings; her bowels became excessively costive, and the stools scybalous and black. The urine grew still more copious; was pale and frothy when first passed, and after a while deposited a thick, white, sticky sediment, which incrusted the utensil, the orifice of the meatus, and the adjacent parts.

About four months before applying at Guy's, she first perceived impairment of the sight of the right eye, and in a short time vision became completely extinguished. Two months afterwards the left eye began to suffer in the same manner, and soon was also blind. On presenting herself at the hospital, she was only able to appreciate light and passing shadows with either. On examination, the tunics of the eyes were found healthy; but the aqueous chambers were rendered shallow in consequence of the irides being pressed towards the cornea by large, soft, lenticular cataracts, which occupied the entire area of the pupillary apertures.

The urine was pale, frothy, copious, without any particularly sweet odour; but proved to contain a large amount of saccharine matter, on the application of both Moore's and Trommer's tests. Its specific gravity was 1040. This patient, perhaps discouraged by overhearing her condition spoken of unfavourably, did not continue her attendance at the hospital.

I shall add but few remarks to the foregoing cases. There can, apparently, exist no doubt as to the dependence of the cataracts upon the diabetic malady; in fact, the occasional connection between the two diseases has been observed before. But why the connection, if real, as I believe, and not a mere coincidence, is so seldom comparatively exemplified; and what is its nature—beyond the mere general statement that it has relation to the nutritive function, which throughout the body is affected in diabetes—I am not prepared to explain. It may be observed, however, that this complication is probably of more frequent occurrence than is suspected; and that the few illustrations, which, having noted circumstantially, I have been in a position to relate in this paper, are not (unless my memory deceives me) all which have fallen within the scope of my own individual experience.

This brings me to speak of the characters which the cases in question have displayed, and which have been sufficiently uniform to enable me to recognize the last instance as one of their category, before any complaint of urinary disorder was preferred by the patient. The cataracts have in every example been symmetrically developed on both sides; the lenses have increased remarkably in their antero-posterior diameter, so as to encroach upon the depth of the anterior chamber, and even to interfere mechanically with the free play of the iris. The opacity has attacked portions of several strata of the crystalline at once, leaving intermediate spaces for a while transparent. The colour and bulk of the cataracts have invariably indicated their soft consistence, which was proved by operation in two persons, though respectively of "middle" and of forty-eight years of age. Lastly, the ocular affection has only arisen after a considerable duration of the renal malady (a circumstance which may tend in some degree to account for the comparative rarity of their union); and there has, in no case, been reason to suspect further disease of the eyeball.

In conclusion, I must advert to the proper treatment of this class of cases. My experience would lead me strenuously to deprecate any operative interference with them, so long as a useful degree of vision is preserved; and to adhere to palliative treatment by mydriatics for a longer time, than in ordinary cases of cataract would be expedient or right. This recommendation is chiefly founded on the indisposition of the cornea to heal even the minute wound inflicted by a needle, as illustrated by the first of the above examples. A period, however, arrives, when all useful vision is extinguished; and then, unless the general powers are rapidly failing, there can be no doubt of the duty of attempting to afford relief. Depression (if not on other grounds to be discountenanced) would be clearly inapplicable here, as indicated by the uniform signs of softness, and as established by the second case, wherein the needle, introduced to effect this operation, passed smoothly through the very centre of the cataract. Extraction, even linear, is forbidden; for the reason just assigned against early operation, if the evidence afforded by Case 1 is entitled to any weight.

There remain, therefore, only the varieties of the operation for solution available, and I should have no hesitation in again selecting keratonyxis by preference to any other mode. In performing it, the surgeon should be more than usually scrupulous, to employ a needle of the greatest delicacy; to make sure that the shaft will completely fill the aperture made by the point; to confine his first manipulations to a narrow area in the centre of the capsule; to effect his purpose at that spot steadily, in as brief a time as may be; and carefully to withdraw the needle, with the flat surfaces of its point as they were introduced, parallel with the plane of the iris, and thus to avoid the minute crucial wound otherwise necessarily inflicted. The neglect of these precautions, by permitting escape of the aqueous humour, would probably render the whole process abortive. Had they been fully observed in the first case narrated above, its issue might have been different; but they were not at that time recognized by surgeons as essential in a well-executed operation on an ordinary case; nor, of course, in one of the particular class we are considering. When, however, the diminution in the normal quantity of the aqueous solvent—demonstrated by the advance of the iris towards the cornea; the pressure to which that remaining quantity is subjected; and the doubt, whether an external communication with the chamber, once opened to the humour, will ever be sealed against it by the healing process, are regarded by the light which the case just alluded to affords; the extreme, the vital importance of these minutiæ, under similar circumstances, becomes at once apparent.

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50. *Chloroform in the Operative Surgery of the Eye.*—Dr. S. A. Cusack read before the Surgical Society of Ireland (April 9th) the following observations on this subject.

"While chloroform has been since its discovery almost universally employed to alleviate the pain and facilitate the performance of all other surgical operations, the question still remains undecided, whether it is an assistance, or the reverse, in cases affecting the eye, more particularly in the operations for the removal of cataract, in which its administration is, so far as I have observed, the exception to this general rule. It is not very difficult to understand why this should be so, when it is remembered that, on the one hand, operations on the eye are not considered to be so painful as on other parts of the body, and, on the other hand, that certain grave objections have been made to the administration of chloroform in these cases, sufficient, I admit, to deter from using it, those surgeons who, confining their attention to this special department of medical science, have not learned its value by having constant recourse to it in other surgical operations. Of late years it has been the custom with many hospital surgeons to operate upon such eye cases as may come before them without drawing any line of demarcation between them and diseases affecting other parts of the body. Acting upon this principle at Steevens' Hospital, I have been in the habit, during the last three years, of using chloroform in ophthalmic cases as invariably as in amputations or any other operations, and with as satisfactory results. As, however, the experience of many other surgeons

has not coincided with my own, I think the question is one particularly suited for discussion in a Society such as this.

"Before mentioning the circumstances which have contributed to my own very favourable experience of the administration of chloroform, it may be desirable to consider in detail the arguments which are used against its adoption.

"1st. It has been stated that the patient has not the necessary power of directing the eye while under the influence of chloroform, and that the cornea may be turned upwards and inwards to such a degree as not to be controlled by the fingers of the surgeon—an event quite sufficient to prevent the necessary flap being made for extracting the lens; this, I admit, at first proved a serious objection to its use. Last year, however, a very convenient method of fixing the eye, by holding the conjunctiva in a forceps, was described by Mr. J. F. France, in the fourth volume of the Guy's Hospital Reports, and, with the assistance of this contrivance, I find that the difficulty is completely obviated; indeed, I may take the present opportunity of stating, that in extraction of cataract, and every other operation upon the eye that I have lately performed, I have adopted Mr. France's plan, which I believe to be one of the greatest modern improvements in this department of surgery.

"2d. It is objected that vomiting may take place during or after the operation, and cause displacement of the flap or ejection of the vitreous body. In answer to this objection I can state that, during the last three years, I have paid particular attention to this point in the surgical practice of Steevens' Hospital, and have never seen it occur in the case of operations on the eye, and only in two other instances in which the patient had transgressed the rules of the hospital by having breakfast before the operation. This fortunate state of things I attribute to the circumstance, that our operations are performed early in the morning when the stomach is empty of food—a condition which, looking at the question in a physiological point of view, can only be insured when sleep has intervened between the last meal and the operation, as otherwise food may remain undigested for many hours in the stomach, from the mental disturbance which a patient must necessarily experience before any operation.

"3d. It is argued that extraction of a lens through the cornea is not a very painful operation. Admitting, however, this to be the case, the fear of an operation is almost as bad as the reality; and I have observed patients to dread this operation as much as any other, notwithstanding the assurances of the surgeon that it would be attended with but little pain, and I have had some cases in which the patient refused to submit to the operation for the extraction of cataract without chloroform. The iris is admittedly a sensitive part, and its division in the operations for artificial pupil is always attended with considerable pain. Lastly, as our object is not only to prevent sensibility to pain, but to procure perfect quietude on the part of the patient, it is necessary to continue the inhalation until the patient is in what the late Dr. Snow has called "the third degree of narcotism," when there is no longer any voluntary motion or perception of pain, and any rigidity of the muscles or spasm which takes place in certain subjects has passed away. The operation should be performed of course while the patient is in the recumbent position; and, so far as my experience goes, there will be much less risk of ejection of the vitreous body or any other untoward event than when he is able to struggle or attempt to close his eyelids before its completion. The patient should either be removed to his bed before he has recovered from the effects of the chloroform, or be left upon the operating couch for some hours.

"Dr. JACOB had no doubt that the operation could be performed under the influence of chloroform, but he also knew from experience that it could be performed well, without the patient being under any such influence. He believed the state of the question to be this: that they had not before them sufficient evidence to enable them to judge as to the necessity or expediency of resorting to the use of chloroform. Looking back to a long experience of operations, such as breaking up the lens, artificial pupil, and things of that kind, he was disposed to say 'no chloroform.' He would rather deal with a patient having his ears open to receive his directions as to the way in which he should turn his eye, thus lending him his aid towards conducting the manipulation, than with

a comparatively lifeless being. As to difficulty of performing any needle operation without the assistance of chloroform, he never had any: he had not yet met the patient that he could not command with the needle in the cornea; and in the progress of the operation, he had unquestionably derived a great deal of aid in many cases from the patient being conscious and capable of bringing his eye into the exact position required. Even in cases of artificial pupil, which required great delicacy of manipulation, and nice handling to adjust the eye to the instrument, he rather inclined to the belief that it was in general safer to trust to the resolution of the patient than to the effects produced by chloroform: still he did not want to assert anything positive until they had further opportunities for testing the matter. One patient would hold his eye as if it were fixed in a vice, and make no effort or struggle, so that the operation could be accomplished with perfect success; whereas, in others, the eye oscillated under the needle, and left it scarcely possible to catch the opportunity of pushing the point of the instrument into it; of course, with a patient of that kind, it would be better to administer chloroform. Having been long aware of the difficulty of managing some persons, especially in cases of artificial pupil, he never ventured to take any step without first trying the steadiness of the patient by placing the handle of the needle against the globe, some days before the operation. He was not objecting, however, to chloroform, but to its indiscriminate use; in some cases it is desirable, while in others it is preferable to avoid it; but at the same time, he must repeat that he never met with a patient whom he could not command with the needle, in operations for cataract, even in the case of infants or grown-up children; and with a resolute resisting boy, if his hands were secured, the moment he fixed the point of the instrument in the cornea, he defied him. In cases of extirpation, chloroform was most desirable, especially if there was a probability of a continuance of very painful manipulation; yet here, again, he might be prejudiced against the use of chloroform in eye operations, inasmuch as the first case in which he employed it, he had a narrow escape of killing the man, and from that day up to the present hour he was timorous as to its use.

"Dr. Jacob said that, in extraction, it was very probable the operator could get the eye of an unsteady patient into a better position under the use of chloroform; but they all knew that the difficulty in such cases was the danger of subsequent sickness, which caused the loss of many an eye, and especially where the iris suffered much pressure or injury. He had seen several operations spoiled in consequence of vomiting, and how far chloroform might add to that amount of risk he did not pretend to say, inasmuch as he had not given it the requisite trial. In hospital practice they frequently met with clumsy fellows who would resist and struggle, but even with such persons he would rather undertake the operation, free from the influence exercised by chloroform. In private practice persons were easily restrained by their friends and could be safely relied upon when impressed with the necessity of keeping steady. To that extent consisted the difference between chloroform and no chloroform in cases of extraction. He might wind up his remarks by repeating, that he believed there were certain cases in which it was desirable, and others in which it was exceedingly objectionable."—*Dublin Med. Press*, April 27, 1859.

MIDWIFERY.

51. *Retrocession of Labour.*—Dr. Charien directs attention to the fact, that at any period of pregnancy, but particularly during the latter months, labour may commence and proceed regularly, so far as that the os uteri is opened up so considerably as to put the projecting bag of membranes on the stretch, and yet not only does complete rest recur, but the retrogression is so complete, that the os uteri closes again till some weeks after, when the labour begins afresh, and proceeds uninterruptedly to its close. In evidence of this, he cites four

cases: The first occurred in the Obstetrical Clinique at Paris. A woman, eight months pregnant, was seized with regular pains; the os uteri opened to the size of a five franc piece and was soft; towards evening the water came away; during the night the pains continued regularly, but at 4 A. M. ceased entirely; the os uteri gradually closed, and, by the following evening, was quite shut. Twenty-one days after, the labour set in anew, and proceeded regularly to its termination. In the second case, the birth took place 32 days, in the third 35 days, and in the fourth 22 days, after the first occurrence of labour.

(Professor Streng relates a remarkable instance of this retrogression of labour in the case of a woman brought to his clinique, with true labour pains, the os uteri dilated to about the size of a groschen, with distinct tension of the projecting bag of membranes, and considerable hemorrhage from a lateral insertion of the placenta; to subdue this, injections of cold water, with the subsequent addition of muriate of iron, were successfully employed, and the patient strengthened by cordials; but the pains then ceased entirely, the os uteri closed, and the birth did not take place till eight days after, when it occurred naturally.) Such observations encourage the attempts to subdue premature labour, the best means for which are perfect rest in the horizontal posture, and the use of narcotics, as opium, *per anum.*—*Ed. Med. Journ.*, May, 1859, from *Prager Viljschft.*, 1859, Bd. i.

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52. *Physiology and treatment of Placenta Prævia.*—Dr. ROBERT BARNES, in a paper read (April 6, 1859) before the Obstetrical Society of London, related some recent cases illustrating these points. The author sought to avail himself of the foundation of the Obstetrical Society of London to elicit the experience of its members as to the different principles of treatment of placenta prævia. He submitted fourteen cases which had come under his own care since the publication of his work on the subject; and appended two series of propositions—the one physiological, the other therapeutical—which appeared to be either proved or illustrated by those cases.

Among the physiological propositions were the following: That in many cases of placental presentation, there arrives a stage when the hemorrhage is spontaneously arrested. That this physiological arrest is not owing to pressure upon the bared surface of the uterus by the bag of liquor amnii, or the child; nor to death of the child; nor to syncope; nor to total detachment of the placenta. That this physiological arrest of the hemorrhage is observed when that part of the placenta which had been implanted within the cervical or lower zone of the uterus has been all detached, contraction of the uterus attending. That, this stage reached, there is no physiological or pathological reason why further detachment of placenta seated within the middle and fundal zones should occur until after the expulsion of the child, when—and not till then—the remainder of the placenta is cast off as in normal labour. That the position of the greater portion of the placenta to the posterior wall of the uterus in these cases, where it forms, by resting on the projecting promontory of the sacrum, a solid inclined plane, directed forwards, is a frequent cause of the transverse presentations which are apt to complicate placenta prævia. That in the great majority of cases where an edge of the placenta comes down to the os internum uteri, the umbilical cord springs from this edge, and thus is ready to fall through into the vagina, should the os not be occluded by the child's head.

Amongst the therapeutical propositions were the following: That owing to the high vascularity and development of the lower segment of the uterus, resulting from this part being the seat of the placenta, uterine inflammation and puerperal fever are exceedingly likely to ensue from the pressure and contusion attending the passage of the child. That this danger is much increased by the forcible introduction of the hand for the purpose of turning and extracting the child before the os uteri has expanded. That in some cases, where it is observed that the placenta has been separated spontaneously from the lower segment of the uterus, the os being expanded to the size of a crown-piece, and the hemorrhage having ceased, it is not necessary to interfere with a labour now become natural *quoad* placental attachment. That since the os internum uteri must expand to the diameter of the child's head, and since, during the dilatation,

placenta adhering to the lower segment is liable to successive detachment, causing hemorrhages, it is an indication to expedite this stage of the labour as much as possible. That in some cases the ordinary means of inducing contraction—such as rupturing the membranes, plugging the cervix, ergot or galvanism—will suffice to cause the rapid and safe expansion of the os. That the adhesion of placenta to the lower zone of the uterus impedes the regular progress of labour, and delays the equable expansion of the os uteri. That in those critical cases where forced delivery or the artificial total detachment of the placenta are dangerous or impracticable operations, the introduction of the index finger through the os, and the separation of the part of the placenta adhering to the cervical zone, is a safe and feasible operation.—*Med. Times & Gaz.*, April 16, 1859.

53. *Scarlatina after Delivery.*—Dr. Fleetwood Churchill, read before the Association of the King and Queen's College of Physicians the following interesting cases:—

Case I.—December 14, 1858, sent for to Mrs. S., and received the following history: A delicate lady, suffering a good deal during pregnancy, taken in labour of her fifth child December 13, and was delivered early in the morning, after an easy labour of a few hours. Placenta came away naturally; no hemorrhage; pulse quiet and good.

During the day she went on quite well; lochia natural.

In the evening Dr. Smith found the pulse alarmingly quick and very weak, without anything to account for it. No pain; no local distress; no excessive discharge.

Dr. Jacob, of Maryborough, was sent for, but nothing local or general could be ascertained with any certainty to account for it, unless it might be the commencement of a latent form of uterine phlebitis. Some calomel had been given on this supposition, but was suspended on account of diarrhœa. Nourishment and wine were liberally given, with benefit to the pulse and strength. The next day, December 14, I was sent for, and arrived at 10 P. M., the report at that time being that the patient was rather better. I found that there had been no rigor; there was neither enlargement of the uterus nor tenderness of it, or any part of the abdomen; no swelling; no tympanitis; lochia plentiful but rather pale, and not offensive; urine copious, and passed naturally; pulse 140, very weak and wavy. Upon minute questioning, she told me that she had neither pain nor distress of any kind. Countenance pale, but calm and easy; neither hurry nor distress in breathing, alæ nasi quiet; no headache. I examined the chest very carefully; on percussion it was resonant everywhere; respiratory murmur full and equable; not an abnormal sound throughout. Upon examining the heart there was no enlargement, but the rhythm of the sounds was destroyed by the disappearance of the first sound; there was no impulse, but the second sound was natural.

This, then, was the only deviation from the healthy condition that I could detect, after a most careful examination of every organ of the body. And what explanation did it afford of the perilous condition of the patient? I confessed that explanation I had none to give; all I ventured to say was, that the uterine system was not in fault, but that the disease was in the heart or circulating fluid.

I lay down about 2 o'clock, and at 5 A. M. the Doctor came to me to say that the pulse had begun to sink again. I found her in precisely the same condition as before, with that exception. The pulse was 150 or 160; the respiration rapid, but not difficult; and, in spite of strong stimulants, her state went from bad to worse, until she lost the power of swallowing, became insensible, and finally died about 11 A. M., without pain, struggle, or convulsion.

I returned to town, I may frankly confess, very much puzzled, and by no means comfortable; but the mystery was cleared up when I heard, two or three days afterwards, that the nurse and the lady's husband were laid up with a very severe form of scarlatina. I have no doubt that the scarlatina poison, acting on a system weakened and rendered usually susceptible by delivery, had caused death before the ordinary symptoms of that disease had time to develop themselves.

Let us now pass on to—

CASE II.—On February 23d Surgeon Morgan asked me to visit Mrs. B. with him. She had been confined, February 21, of her thirteenth child, after a natural labour, and was doing well until the morning of the 23d, when she awoke with palpitation and a weak pulse of 140, but without pain.

I found the pulse 130, and very weak. There was a nervous tremulousness about her, and a frightened look. She complained of nothing but excessive weakness; no pain, no distress. The uterus felt rather larger than usual, but not tender; lochia quite natural, and without odour. Some milk in the breasts. On examination the lungs appeared perfectly healthy, and there was no abnormal sound in the heart, but the first sound was weaker or less loud than the second.

In short, we could find no satisfactory local cause for the patient's condition, and in fact, no deviation from organic health, except in the rhythm of the heart. Remembering the former case, I asked if any of the family had recently had scarlatina or measles, but was told that they had not. Under such absence of grounds for correct diagnosis, it was clear that our duty was to treat the prominent symptom (exhaustion) actively, whilst we took some precautions as to certain possibilities.

This we did by the exhibition of stimulants and nutriment, and by poultices to the abdomen. Without troubling the Society with the daily report, I may briefly state that the patient became weaker on the 24th and 25th; at noon of which day Dr. Morgan thought she was dying. No local derangement could be detected at any time, and she took freely, and retained, both food, spirits, and medicine. Her nights were rather restless, and her sleep not refreshing. On the evening of the 25th we determined to try the full exhibition of quina, and accordingly gave her six grains at bedtime, and three grains every three hours when awake.

The next day there was a perceptible improvement; she had slept better, and felt more comfortable. The pulse was only 120, though weak. The quina, claret, and Hoffmann's liquor were continued.

February 27. A more decided improvement. Pulse 116, fuller and firmer: feels stronger, and had no weakness at noon, as previously. As she complained of headache and singing in the ears, the quina was omitted, but food and wine continued.

On the 28th I found her so much better that I ceased my attendance. She had slept very well; pulse 104, and fuller; no local distress; no feeling of excessive weakness. From this time Dr. Morgan informs me that convalescence progressed favourably.

Up to this point we were at sea as to the nature of the attack, although we had the benefit of Dr. Corrigan's assistance; but on the evening of the 28th I think the solution of the problem was afforded by the fact of one of the servants showing unmistakable evidence of scarlatina.—*The Dublin Quarterly Journal Med. Sci.*, May, 1858.

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54. *Hypertrophy of the Heart during Pregnancy.*—In 1826 and 1827, Dr. LARCHER determined, from the results of 130 observations made at the Maternity Hospital of Paris, that the left ventricle is enlarged during pregnancy. There was not a single exception to the rule in the 130 cases examined. Twenty years later Dr. BEAU investigated this subject anew. At his request, M. Ducrest, Interne of the Maternity, carefully examined the question in 100 cases, and his results fully confirmed the views of Dr. Larcher, who laid down as a law: That there was a coincidence between hypertrophy of the heart and of the uterus during pregnancy.—*Med. Times and Gaz.*, May 7, 1859.

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55. *Exomphalos, in which the Gravid Uterus formed the Hernial Mass.*—Mr. MURRAY related to the Obstetrical Society of London (April 6, 1859) a case of this, which he believed to be the first on record, and to possess features of great interest and importance. The patient was a woman, aged thirty, the mother of three children, and had been from infancy affected with a small umbilical hernia, which had always been easily reduced. When on the eighth month of gestation

she found one morning, in rising suddenly from the recumbent position, that a large tumour had forced itself through the navel. This protrusion proved to be nothing less than two-thirds of the impregnated uterus, the fœtus being distinctly recognized by palpitation. There was no rupture of the linea alba. Reduction was at once effected by means of gentle and careful manipulation, and the organ was happily kept *in situ* until the end of gestation, when a live female child was born. Mr. Murray quoted two or three cases from Boivin and Burns, which were somewhat analogous, but differed from the present case, inasmuch as the central tendinous cord had in them always yielded or divided; and concluded by observing that the fact of the uterus being subjected to some amount of handling at this late period of gestation without producing labour, was interesting.—*Med. Times & Gaz.*, April 16, 1859.

56. *On Hypertrophic Elongation of the Neck of the Uterus in Prolapsus Uteri, improperly so called, and on its Treatment by Amputation of the Neck of the Uterus.*—M. Huguier, surgeon to the Hôpital Beaujon, Paris, maintains that the ordinarily received opinion is erroneous, viz., that the appearance of the os uteri at the vulva, or of a greater or less portion of the uterus itself beyond the external organs of generation, is the result of a displacement of the organ, of a general lowering, or of a true prolapsus *en totalité*; and he holds that this opinion can be shown to depend on inaccurate observation. When the uterus appears externally, and even when the vagina is completely inverted, and the uterus, from the size of the tumour in the centre of which it lies, appears to be entirely prolapsed between the thighs, it is not because it has become generally lower in level, and completely left the pelvic cavity, but simply because it has undergone a partial or general (as the case may be) hypertrophic elongation. The best proof that can be given of this is, that in almost all the cases, the body of the uterus remains nearly in its usual situation; and that, if we examine the tumour with care, and measure the uterine cavity by means of the uterine sound, or any other appropriate instrument, the elongation is easily detected. And we can equally assure ourselves of the presence of the body of the organ in the pelvis by careful palpation of the tumour, and by the introduction of one or two fingers into the rectum. M. Huguier does not treat of all the various kinds of uterine hypertrophy; but confines himself to the consideration of the longitudinal hypertrophy which simulates, accompanies, or determines the descent of the uterus. The two principal varieties of the longitudinal hypertrophy—viz., as it affects the uterine neck *above* or *below* the insertion of the vagina—constitute two different diseases, although their nature is the same. Their causes, their mechanism, their symptoms, the accidents they may determine, and even the treatment they demand, are, however, quite different. Hence these two conditions demand separate consideration. And 1st, with regard to the hypertrophic elongation of that portion of the uterine neck *below* the insertion of the vagina. This is not of so much importance as the other form of hypertrophy; and we give merely the *conclusions* with which M. Huguier terminates this, the first part of his paper. 1. In this variety, the body of the uterus forms in the cavity of the vagina a cylindrical *swelling*, either resembling a more or less elongated cone, the free extremity of which approaches the vulva, or even passes between its labia without any shortening or inversion of the vulvo-uterine canal. 2. This elongation, which has been noticed by Morgagni, Saviard, Bichat, Lallemand, Desormeaux, Lisfranc, and Boivin, was considered by them as a simple anatomical variety. 3. Even until lately, it has been commonly confounded with the sinking and descent of the uterus, when it has been mistaken and treated for a polypus, a chronic retroversion, a follicular cyst, a cancerous or a dropsical enlargement of the neck. 4. No anatomical and nosological description has yet been given of it, although it possesses sufficiently precise characters as regards its causes, development, symptoms, and treatment. 5. The medical appliances, and the different kinds of cauterization, are only applicable to cases of slight hypertrophic elongation, and particularly to those which are of little extent, and are complicated with inflammation and engorgement. 6. When a hypertrophic elongation of the vaginal portion of the os uteri causes serious symptoms, and has attained a length of from five to seven centimetres, there is only one truly

efficacious means of cure, viz., the resection of the uterine neck to half a centimetre below the insertion of the vagina. The second part of the paper is taken up with the consideration of the hypertrophic elongation of that portion of the uterine neck situated *above* the reflexion of the vagina and its escape outside the vulva. M. Huguier affirms that the affection designated by authors and practitioners under the names of prolapsus and complete descent of the uterus is nothing else, in the very great majority of cases, than a longitudinal hypertrophy of the uterus, the body of which remains in the pelvic cavity, even although the vagina be entirely inverted, and the tumour hanging between the thighs be equal or even superior in length to the uterus in its normal condition. This proposition, startling though it appears, is the result of fifteen years' labour and conscientious inquiry. He denies the frequency of the complete prolapsus, holds that it is rarely seen, and that it has been generally confounded with the hypertrophic elongation of the upper portion of the uterine neck. Indeed, the swelling, which up to the present time has been described as complete descent or prolapsus, may depend on two different conditions—the one quite exceptional, viz., the true descent of the uterus with or without longitudinal hypertrophy; the other much more frequently met with, and forming the subject of the present paper. In establishing his proposition, M. Huguier relies on three kinds of proofs: viz., on cases scattered through the records of science, on pathological anatomy, and on clinical observation. Under the first head, reference is made to cases related by Saviard, Morgagni, Dance, and Cloquet. Under the second, the magnificent work of Cruveilhier is appealed to; and M. Huguier asks, if cases of the complete descent of the uterus were as frequent as authors pretend they are, how comes it that Cruveilhier has only been able to give a single representation of the affection in a work on which he has been occupied twelve years, and which he closed with the description of the diseases of the uterus and ovaries? With the exception of two cases, observed by MM. Morel-Lavallée and Blandin, M. Huguier knows of no others where the characters of the affection have been described in such a manner as to leave no doubt as to its exact nature. Of course, in this review, cases accompanied by considerable peritoneal effusion, or with very voluminous ovarian cysts, where all the pelvic organs are apt to be pushed downwards, are excluded. Since the year 1843, when M. Huguier began to use the uterine sound, he has carefully examined sixty-four cases of pretended complete prolapsus; and of this number only two were instances of true and complete prolapsus, unaccompanied by hypertrophic elongation. In a third case, there were at once complete prolapsus, retroflexion, and considerable hypertrophic elongation of that portion of the uterine neck above the insertion of the vagina. In this series of sixty-four cases, M. Huguier has included only those which would be considered, according to the descriptions of authors, as instances of complete prolapsus, in which the length of the tumour was at least equal to that of the uterus in its normal condition (though in most cases it exceeded this), and where the vagina was completely inverted. All cases of slight descent of the uterus, described by authors under the name of semi-prolapsus or incomplete descent, and even those where the neck and vulvo-uterine canal, partly inverted, projected from two to three centimetres from the vulva, were excluded. After mentioning that for some time past he has been in the practice of expounding these facts at his hospital visit, and that M. Robert, at the Hôpital Beaujon, has verified them in his own practice, M. Huguier concludes by stating that a careful examination of the various preparations in the Musée Dupuytren, along with the conservator, M. Houel, only confirms the truth of his observations.—*Edinburgh Med. Journ.*, April, 1859, from *L'Union Médicale*, March 10, 1859.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Case of Spontaneous Evolution of the Fœtus. Reported by DAVID D. RICHARDSON, M. D., of Blockley Hospital.

MARY ANN BURK, born in Ireland, aged 23 years, was admitted into Blockley Hospital October 25, 1858. On the Friday preceding her admission, while at work, she received an accidental blow over the uterus which ruptured the membranes and produced the entire discharge of the liquor amnii. The patient was not at term by several weeks. During Friday, Saturday, and Sunday her sufferings were very great. On Monday, as above stated, she was admitted into the Hospital, having been conveyed there in a carriage; still in much pain, she was taken to the obstetrical ward without delay and placed in bed. Making an examination per vaginam, I found an elbow presenting; but owing to the rigid contraction of the os uteri about the arm, made no attempt to correct the presentation. The uterine contractions soon became rapid and vigorous. On making a second examination, I discovered the right hand protruding through the external organs.

About two hours subsequent to the first examination, the os was patulous, and the vagina relaxed and moist.

Deeming this an appropriate time to interpose, I endeavoured to make version by the feet; but finding the uterus so sensitive as to contract energetically upon the slightest touch, was obliged to desist. In the hope of obviating the mal-presentation, I exhorted the patient not to bear down, and she endeavoured to obey the injunction, but without avail. The uterus continued to contract rapidly. Fearing laceration, I introduced my hand, determined to make the most eligible change in the position of which the case would admit. Much to my relief and gratification, I found the child's arm had receded into the uterus, the hand only remaining without the os. In the course of an hour and a half the child was ushered into the world, the head being first born, making evidently a case of spontaneous evolution. The fœtus weighed five pounds and a half—was stillborn, having been dead apparently several days. The patient convalesced happily—suffered no unpleasant consequences, and was able to resume her usual avocations in about ten days. This was her second accouchement, her first child having also been born dead. It may not be uninteresting to state that the whole time occupied in the above process, from the time the patient was placed in bed until her delivery, was about five hours.

My colleague, Dr. Thomas L. Taylor, and others, were present and examined the case.

The Local Application of Belladonna for the Dispersion of the Milk. By GEO. MCC. MILLER, M. D., of Brandywine Village, Del.

The number of this journal for July, 1858, contains a report of a case in which, with apparent effect, I employed the extract of belladonna,

locally applied, for the dispersion of the lacteal secretion. So far as I am aware, this was the first *original* American article on the subject, previous notices of the use of the remedy for its supposed antigalactic properties having been culled from foreign periodicals. I now take the liberty to add the following case as seemingly confirmatory of the one just alluded to, and as bearing upon a principle of blended biological and therapeutical interest.

This case occurred to me during last autumn. As I kept no notes of it, and the patient lives at a considerable distance from my residence, rendering access to her inconvenient, I shall be under the necessity of omitting the minor features and details of the case, and shall merely present in a very few words its essential points.

Mrs. M——, aged probably between 30 and 35, the mother of three or four children, the youngest of whom was about a year old, applied to me for something to dry up her breasts, as she desired to wean her babe. The milk was abundant. As the infant was of a suitable age, and the season favourable, I encouraged her to wean her child, particularly as her system was already debilitated and too heavily taxed by the demands for nourishment made upon her by her offspring. I directed her to apply three times a day to the areola of each breast a solution of extract of belladonna, consisting of gr. x of the extract dissolved in f℥ss of water. I usually order only half a fluidounce of the menstruum, as that is sufficient for every purpose. I then left her, requesting her to apprise me, within a few weeks, of the result of the treatment. She complied with my request, and called at my office, stating that she had used the remedy suggested for about a week, and that the milk had dried up. She spoke in high terms of the belladonna, declaring it to be superior to anything that she had ever used for the same purpose before.

It will be observed that I do not use a very strong solution of the extract. As the lacteal secretion is *gradually* established in the natural course of things, so I conceive it ought to be *gradually* suppressed; and this special object is attained by the use of a moderately strong solution.

I of course do not imagine that the two cases which I have reported establish beyond doubt the utility of belladonna in the point of view in which it is here considered. They merely afford a certain measure of presumptive evidence of the fact. My observations are intended principally as hints to those whose opportunities of testing the milk-dispersing properties of the article in question are superior to my own.

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Case of Herpes Zoster occurring a Second Time. By J. FORREST KENNEDY, M. D., of Mechanicsville, Cedar County, Iowa.

Samuel Monroe, farmer, aged 66 years, called on me, April 1st, 1859, to consult me in regard to an eruption accompanied with an intense pain. He stated that *he had had an eruption similar to it about 25 years ago*, and that his physician then called it "shingles."

The present was as well a marked case of herpes *zoster* as could be imagined, but presented some features which I believe to be unusual. It occupied exactly one-half of the circle lying between the linea alba and the spine, on the left side.

The patient stated that he had been riding on horseback, and being thrown, was very much frightened, but not materially hurt. About two weeks after the accident he was attacked with severe and almost intolerable pain in the breast, which extended from the sternum to the spine. The pain

he described as if the left half of his body had been inclosed and tightly tied by a ligature. Thus the pain continued for ten or twelve days, when a little crop of vesicles made their appearance, which gradually spread each way, until they had reached the *ultima thule* of their journey.

He was in this state when I saw him, still suffering a great deal of pain, but much less than before the appearance of the eruption.

The *treatment* was very simple, consisting merely of opiates to relieve the pain, together with an anodyne ointment, and the bowels to be kept in a soluble condition. The eruption has gradually disappeared, though he still experiences considerable pain, which he says is gradually becoming less and less.

The irregularities in the case were, as I conceive, these: 1st. The *age* of the patient, sixty-six years. 2d. Its being his *second* attack. I do not recollect of ever having read of its attacking the same individual the second time. 3d. The *intense pain* experienced so long before the appearance of the eruption, and continuing so long after its disappearance.

Mechanicsville, Cedar Co., Iowa, April 19th, 1859.

Strangury caused by Opium. By John Hockenhull, M. D., of Dawsonville, Dawson County, Ga.

Mrs. C——, the subject of this idiosyncrasy, a stout healthy woman, had been two days before I was called, delivered after an easy and natural labour, of a fine healthy child.

When seen by me she was suffering from slight inflammation of the uterus, for the relief of which I exhibited a combination of calomel, ipecac, and opium, and applied astringent and anodyne cataplasms to the abdomen. Soon after commencing this treatment strangury made its appearance with the usual symptoms, viz., a frequent and an urgent desire to micturate, but without being able to gratify it; burning and cutting pains at the neck of the bladder; cutting pains also along ureters and urethra, accompanied with some tenesmus. This condition compelled me to introduce the catheter daily for four successive days, when, in consequence of the system being under the mercurial influence, I desisted from further treatment. But a return of the disease being threatened, I resumed the former treatment, which was followed again by the strangury. This induced me to suspect that some one of the remedies administered might be the cause of the strangury.

In order to test the correctness of my suspicions, I suspended each remedy in succession, but the strangury continued until the opium was at last suspended. After this the strangury ceased in 24 hours, but again recurred on again exhibiting the opium.

After making known to the family the cause, they informed me she had been similarly afflicted during an attack of bilious fever, while residing in Texas, after opium was administered to her by her physician, but that it was not suspected to be the cause.

Removal of Foreign Bodies from the Ear.—Dr. W. I. Archibald, of Crawfordsville, Miss., writes to us that he has succeeded in removing a foreign body from the ear by the following method, after failing with every other instrument he could obtain; and he is convinced that it will answer in many cases.

A circular piece of isinglass or court-plaster is to be cut of about two lines in diameter. Upon the back of this a thread of 12 or 15 inches long

is to be attached by means of a very narrow strip of plaster of the same kind, placed at right angles over the thread. After this becomes dry, a piece of muslin or cotton cloth is to be torn two inches long and of sufficient width to be rolled around both arms of thread into a cylinder of required size and firmness. The ends of thread should next be drawn so as to bring the plaster upon the extremity of the cylinder. One end of the thread may be wrapped around the cylinder to keep it from unfolding. The meatus to the surface of the foreign body should now be freed from moisture, if present, which may usually be quickly done by turning in the ear a few rolls of lint or soft cotton cloth. After this the surface of the plaster may be wet and applied to the foreign body. From five to ten minutes will perhaps be sufficiently long in all cases for adhesion to take place. On drawing out the plaster, the foreign body will be removed with it.

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Treatment of Diabetes.—By N. W. CALHOON, M. D., of St. Charles, Mo. An article in the April number of your valuable journal, on the treatment of diabetes, suggests to my mind the propriety of communicating to you a promptly successful method of treatment which I have practised for some years past in the management of that disease, particularly as it presents itself in old subjects. Forbidding the use of fluids, except in small quantities, and enjoining the use of solid food and the observance of quietude, I direct the following powder to be taken three times a day, viz., Pulv. Doveri, gr. v; acetas plumbi, gr. iij; sulph. quin., gr. ij If necessary, the bowels are to be kept gently open with ol. ricini. I have never found it necessary to continue the above treatment more than four or five days.

DOMESTIC SUMMARY.

Clinical Report on Pneumonia.—Dr. AUSTIN FLINT has published (*Buffalo Medical Journal*, May, 1859) an interesting clinical report on cases of pneumonia, observed by him at the New Orleans Charity Hospital, 1858 and 1859. We subjoin his conclusions and remarks.

Of the fifteen cases, in all the pneumonia was limited to a single lobe. In one instance two lobes were successively attacked (cases 3 and 4), recovery from the first attack having taken place before the second occurred. This was probably true in another instance (case 9). The lower lobe was the seat of the disease in all save two cases. In one of these (case 4), they had been previously affected, and this was probably true of the other instance (case 9).

Of the thirteen cases in which the lower lobe was affected, the disease was seated in the right side in seven, and in the left side in six.

The pneumonia was primary in twelve of the fifteen cases. Of the three instances in which it was developed secondarily, it occurred as a complication of typhoid fever in two, and as an intercurrent affection in pulmonary tuberculosis in one instance.

In the twelve primary cases, the disease was uncomplicated in all but three instances. Delirium tremens was developed as a complication in ten cases; and in one instance, pleuritis with considerable liquid effusion coëxisted. More or less pleuritis is almost uniformly present in cases of pneumonia, but it is certainly rare for the pleuritis, under these circumstances, to be attended by much effusion.

The ages of the patients varied between 20 and 45, the mean age being about 30. In nearly every instance the patients were robust and in good health when

attacked with the disease. Several were intemperate, and several were subject to attacks of intermittent fever.

Exclusive of three cases remaining in hospital at the end of my term of service (two of these remaining with other affections), and of the case which ended fatally the length of stay in hospital varied from six to twenty-two days; the mean period being a fraction over thirteen days.

A fatal result occurred in one case only. In this case, as already stated, the patient had been discharged a few days before, convalescent from an attack of pneumonia affecting the lower lobe of the right lung. He resumed his habits of intemperance directly he was discharged, and was seized a second time with pneumonia, now affecting the upper lobe of the left lung. He walked to the hospital, a distance of three miles, after being attacked, and died by asthenia, fifteen hours after his admission, without coming under my observation.

Convalesence was rapid in all instances, save one in which the pneumonia occurred as a complication of typhoid fever. Exclusive of this instance, the resolution of the affected lung, as shown by the disappearance of the physical signs denoting solidification, was rapid. The resolution was in all instances complete, slight relative dulness on percussion only remaining, which, as is well known, persists for some time after recovery from pneumonia. In all instances the symptoms of the disease, viz., cough, expectoration, etc., completely disappeared. In no instance were the patients left enfeebled, but at the time of discharge they all reported themselves able to return to their avocations, and the majority were day laborers.

The treatment pursued in these cases, as the reader has doubtless remarked, was not complex. The sulphate of quinia was given in tolerably full doses, in the cases in which intermittent fever had previously existed. This remedy was not prescribed with special reference to the pneumonia, but in order to forestall the development of intermittent fever as a complication. Quinia has been extolled as a valuable remedy in pneumonia, irrespective of the liability of the disease to become complicated with intermittent fever if the patient reside in a malarious section, and, especially, if he has been subject to attacks of the latter affection. However this may be, it is certain that the remedy, given in full doses, does not exert an unfavourable influence on the progress of the pneumonia. It is not contra-indicated by this affection. To prevent the development of intermittent fever, and, if developed, to arrest the paroxysms as speedily as possible, are important objects of treatment in certain cases of the disease under consideration. The combination of the two affections often places the patient in imminent danger, when with either affection, singly, his condition would not be serious. Happily, under these circumstances, we possess a special remedy by which we may expect to control one of the affections. This, then, is the leading indication, and the life of the patient may depend on its being promptly and effectively fulfilled. The practitioner who gives precedence to indications derived from the pneumonia, under these circumstances, or who so divides his attention as to fulfil incompletely the leading indication, commits an error which may be fatal to the patient. As a rule, it is well to recognize, at the commencement, a liability to this complication, and to forestall its occurrence, especially when the protective remedy, to say the least, does not interfere with the favourable progress of the pneumonia.

Opium entered more or less into the treatment of these cases. My observations have led me to regard this as a valuable remedy in pneumonia. As a palliative of pain, it fulfils an important indication; for pain, in addition to the suffering which it occasions, determines an afflux of blood to the painful part. This fact is illustrated in neuralgia affecting the supra-obital nerve. During the paroxysm of pain, the eye becomes injected, and the redness rapidly disappears after the pain has been relieved by an opiate. But there is reason to believe that opium exerts a salutary effect beyond the relief of pain. I have repeatedly noted marked diminution in the frequency of the pulse and respirations, in cases of pneumonia, a few hours after the patient had taken full doses of opium. It appears to lessen the perturbatory effects in the economy of the local inflammation, if, indeed, it does not diminish the intensity of the inflammatory action. Some practitioners are deterred from the use of this remedy in pneumonia, by

the idea that it interferes with the removal, by expectoration, of the exuded products of inflammation. But how often do we observe the rapid disappearance of the solidification in pneumonia, with slight expectoration, or none whatever! The intra-vesicular exudation is, for the most part, absorbed, not expectorated, a fact not strange when the structure of the cells, and the facility of endosmosis in this situation are considered. Interference with expectoration, therefore, if true with respect to the employment of opium in pneumonia, is not a valid objection. The merits of the remedy, however, in this application, must rest on clinical experience; and I cannot but think that this paper will be of some utility, should it serve to remove from the minds of some readers, groundless apprehensions with respect to the free use of opium in pneumonia.

Alcoholic stimulants were employed to a greater or less extent, in the treatment of these cases, and in all the cases the patients were placed on a nutritious diet. The abstract notion that stimulants and sustaining food are inconsistent with the treatment due to local inflammation, is a remnant of Broussaism which still exerts considerable influence on medical practice. It suffices to destroy this notion, to bear in mind the significant injunction of Chomel, viz., *not to treat diseases, but to treat patients affected with disease.* With regard to stimulants, it may be stated, as a rule, that they are indicated in cases of local inflammation, whenever the patient in health is addicted to their use. They cannot with safety be withheld, under these circumstances, if the local inflammation involve, from its seat or intensity, danger to life. But without reference to previous habits, the use of stimulants in the treatment of pneumonia, and of other local inflammations, is important in proportion as it becomes an indication to support the powers of the system. It is, perhaps, an error in medical practice as common and as serious as any, to overlook or depreciate this indication in the management of local diseases. Practically, the existence of this indication and its urgency, in individual cases, may be brought clearly and forcibly before the mind by proposing at the bedside the following questions: Is the patient in danger of death? If death occur, will it take place by asthenia? How imminent is the danger of death by asthenia? Whenever, in the management of disease, the physician has reason to fear that he may lose his patient by asthenia, and in proportion to the tendency to a fatal result by that mode of dying, alcoholic stimulants, as a rule, form an important part of the measures indicated, on the same ground that they enter into the treatment of fevers. And this remark applies equally to nutritious diet, viz., the animal essences, etc. Cases of pneumonia occur in which patients are to be saved by pursuing, boldly and perseveringly, the supporting treatment precisely as in cases of low typhus or typhoid fever. And the indications of this plan of treatment may be present early, as well as late in the progress of the disease. The union of delirium tremens, with pneumonia, for example, often places the patient in imminent danger of death by asthenia. The free use of stimulants and concentrated nutriment, is requisite to carry him safely through the perils of this combination. Two of the cases included in the present collection (Nos. 13 and 14) illustrate this remark.

But even when the danger to life is not great, it is an object to support the system with a view to a speedy and rapid resolution of the inflammation. Alcoholic stimulants may not be required for this object, but it will be promoted by a nutritious diet. The fear of feeding the disease by feeding the patient, is a vulgar notion not warranted by clinical observation. I do not hesitate to allow patients to take food as nutritious in quality and as freely as they desire. The late Dr. Graves was so impressed with the importance of supplying the system with nourishment in febrile diseases, that he desired to be placed as an epitaph on his tomb, "he fed fevers"! He might have extended the circle of diseases in which feeding is important. It is hardly less important, in some instances, speaking metaphorically, to feed pneumonias, than to feed fevers, and, indeed, feeding, as an essential element of supporting treatment, is important in any disease when it is an indication to obviate the tendency to death by asthenia.

With regard to the time when an active supporting plan of treatment (stimulants and concentrated nutriment) is indicated, and the extent to which it is to be carried, I will make but a single additional remark. If there be room for doubt on these points, it is better to err by commencing too soon, and pushing

it too far, than by delay and insufficiency; for while it is easy to discontinue or diminish supporting measures before much if any actual harm is done, time which has been lost cannot be recovered.

Quina, opium, alcoholic stimulants and nutritious diet, constituted the treatment in the cases embraced in this report. The grounds for the non-employment of certain therapeutical measures, in these cases, are now to be considered. Blood-letting, general and local, tartar emetic, the veratrum viride, mercury, cathartics, blisters and other modes of counter-irritation are employed, to a greater or less extent, in the treatment of pneumonia. None of these remedies, however, entered into the treatment of these cases. This fact, without explanation, might lead to erroneous inferences as regards the views of the writer.

Blood-letting in pneumonia has, of late been much discussed. I have contributed my mite towards this discussion,[1] and do not propose to enter upon it in this paper. I will simply remark, that, in my opinion, it is an error to assume blood-letting to be never useful in pneumonia, albeit it is a far greater error to advocate the indiscriminate employment of this spoliative measure in that affection. The propriety of blood-letting, however, is rarely a question in hospital cases of pneumonia. In the great majority of instances when patients are admitted into a hospital, the disease has advanced to the second stage; one or more lobes are solidified, and, under these circumstances, the abstraction of blood will, in general, only tend to retard resolution. Had these cases been under observation from the commencement of the disease, it is possible that blood-letting might have been indicated in some instances, not with a view to arrest the inflammatory action, nor to limit its extent, nor to lessen the amount of exuded products; but to diminish the intensity of symptomatic febrile movement, relieving the heart of over-accumulation of blood in its cavities, and consequent over-tasking of its powers. With this limited view of blood-letting, making due allowance for its evils, it is indicated in only a small proportion even of the cases of pneumonia which come under observation at the onset of the disease.

The tartar emetic and veratrum viride undoubtedly control, in a marked degree, the frequency of the heart's action, and, so far, diminish, for the time symptomatic febrile movement. It remains, however, to be determined, to what extent this effect is important with reference to the inflammatory process and resolution. We can at this day understand how Laennec was deceived in attributing the rapid removal of the exudation in pneumonia to the influence of tartar emetic; for it had not then been observed, as it has been since his day, that the exudation disappears, in some instances, quite as rapidly without any treatment. These cardiac sedatives, if useful when the symptomactic febrile movement is intense, are certainly not indicated when the action of the heart is but slightly or moderately increased, as in a pretty large proportion of the cases of pneumonia in which the affection is limited to a single lobe, especially after exudation has taken place.

The action of mercury has been considered as useful in two ways in pneumonia, viz., limiting the amount of exudation and promoting its absorption. With reference to the first of these supposed effects, the exudation in pneumonia generally takes place, to its fullest extent, before mercurialization can be produced. With reference to the second effect, the exudation is absorbed, in favourable cases, quite rapidly without mercurialization. Without, therefore, presuming to deny altogether the so-called anti-plastic and the sorbefacient powers of mercury, I believe that it is a remedy generally uncalled for in the treatment of pneumonia. The occurrence of salivation at the time of convalescence, is, to say the least, an inconvenience which, if not necessary, it is desirable to avoid. Having for many years relinquished the use of this remedy with reference to its special or constitutional effects in treating this disease, I am satisfied that it may with safety and advantage be dispensed with.

Cathartics, as a means of depletion during the early stage of pneumonia, may be indicated. If adequate to fulfil the object of depletion, they are certainly to be preferred to blood-letting, since they do not involve an expenditure of the

[1] Report on Blood-letting in Pneumonia, Buffalo Medical Journal, vol. xi. 1856. Page 288.

organized constituents of the blood, and are therefore not spoliative. Except for this purpose, it may fairly be doubted whether they are called for in pneumonia. They conflict with supporting measures when these are indicated. That they are not important with reference to the absorption of the exudation, is sufficiently illustrated by the cases reported in this paper. In one of the cases (No. 15) considerable liquid effusion, together with the solidifying deposit, disappeared in a few days, although, inadvertently, the bowels had been permitted to remain constipated for a week.

Blisters and other modes of active counter-irritation, when employed in pneumonia, are, of course, considered as acting usefully by way of revulsion. I suppose that no judicious physician attributes to them this action during the first stage of the disease. To employ them in this stage is to add a certain amount of cutaneous inflammation to the existing pulmonary inflammation. After solidification has taken place, all the results to which the inflammation may be expected to give rise, have already occurred. Revulsion, then, where it is attainable, ceases to be an indication. Is it imagined that a traumatic inflammation of the skin diminishes the afflux of blood to the affected lung? But the affected lung in the second stage of pneumonia is already anæmic! The inconvenience occasioned by blisters to the patient is considerable; they are also a source of inconvenience to the practitioner, by interfering with the daily examinations of the chest in order to determine the physical condition of the affected lung. These remarks, of course, do not apply to mild revulsive applications, such as sinapsims, and to fomentations which doubtless possess a certain value in the treatment of pneumonia.

The several therapeutical measures, thus, which have been enumerated, as not entering into the treatment of the cases of pneumonia now reported, were not employed, because, with reference to some of them, the disease did not come under observation sufficiently early to find the indications for their use, or, the indications existing in a certain proportion of cases only, they did not happen to be present in these cases; and with reference to other of the measures mentioned, their value and propriety in the disease under consideration are, to say the least, doubtful. As the modern conservative surgeon rejects the doctrine contained in the old aphorism, *melius anceps remedium quam nullum;* so the conservative physician should refuse to resort to remedies which are either unnecessary or of questionable utility, except in the cases in which a deviation from this rule is warranted for experimental observation. I cannot but think that the practice of medicine would gain much if practitioners, instead of deliberating at the bedside as to whether this or that potent remedy is called for, were oftener in the habit of propounding to themselves this inquiry: Are there present any clear indications for interference?

The last remark suggests a point of fundamental importance in the treatment of this, as well as other acute diseases, viz., its intrinsic tendency as regards termination. Does pneumonia, in itself, tend to destroy life? We might answer this question by citing the results as reported by different practitioners, the disease being treated by different and sometimes quite opposite measures. But the clinical study of the disease uninfluenced by medication, pursued of late years on an extended scale, enables us to answer the question more directly. The results reported by Dr. Dietl, and others, in which, in a large number of cases, no active remedies were employed, show that pneumonia, limited to a single lobe, and uncomplicated, ends in recovery in the vast majority of instances. This statement is, of course, exclusive of the epidemic forms of the disease; but it is probable that the fatality of epidemic pneumonia depends generally on some important complication, or associated affection. A series of cases of sporadic, uncomplicated pneumonia, therefore, ending favourably, under a certain plan of treatment, does not afford adequate evidence that the success was due to the treatment. It would be a fairer conclusion to impute the success to the intrinsic tendency of the disease to recovery. On the other hand, a series of cases in which the fatal cases were not few, would justify, at least, a suspicion that the want of success might be due to the treatment. It would, however, be an error to suppose that because pneumonia, under favourable hygienic circumstances, generally ends in recovery without medicinal treatment, that medication is con-

sequently never called for. Better far, indeed, no treatment than injudicious interference; but judicious treatment may nevertheless save some lives which would be lost under the expectant plan. Moreover, there are objects of treatment in disease, in addition to recovery. Relief of distressing symptoms during the progress of disease; a cure *cito et jucunde* as well as sure; a convalescence rapid, and a recovery complete, leaving the powers of the body not permanently impaired—these are important ends to be kept in view in medical practice. The natural history of a disease, and its intrinsic tendency to life or death, constitute the true point of departure for the study of therapeutics in relation to that disease; but medical art should not be content with being able to state the chances of recovery, even when the chances are vastly in favour of this termination.

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Ovariotomy.—Dr. D. McRuer, of Bangor, in an interesting paper on this subject (*Maine Med. & Surg. Reporter*, February, 1859) divides cases of ovarian disease into three groups, each having, he considers, a different relation to the operation: "1st. Those that are ushered in by acute symptoms, and severe constitutional disturbance, producing in their early stages a great prostration of the vital powers. 2d. Those cases which are mild in their manifestations, and slow in their progress, producing little or no constitutional suffering, and requiring many years of continuance before a resort to tapping becomes necessary, or a repetition of it required—and another group, intermediate in their relations to those already mentioned; and to this latter class of cases of ovarian disease, the writer would confine the operation of gastrotomy, and of these, a careful selection should be made, of such cases as by repeated minute examinations, exhibit satisfactory evidence of being exclusively ovarian, having a freedom from extensive adhesions, or any other complication, objectionable to an operation. Even in these cases the operation ought not to be urged, but only suggested, giving at the same time a candid explanation and avowal of opinion, in regard to the chances of its success, leaving the decision to the patient; for no person can properly estimate the value another sets upon his life, or make the just deduction from its worth, on account of the sufferings of disease; each case being a problem, having its own peculiar number and variety of elements, and defying an equitable comparison with any other.

The foregoing classification of ovarian disease in its relation to an *operation*, is not a mere hypothesis, for it has a foundation in the natural history of that malady, and the following cases may be considered fair representatives of each group.

In the case of Mrs. R., of H., the disease manifested itself by acute suffering in the ovarian region, severe febrile paroxysms, general tenderness of the abdomen, a rapid growth of tumour, terminating in six months from the access of the disease in such an amount of effusion as to require the aid of the trocar to relieve the consequent thoracic oppression, and its repetition in three months after; the case terminating fatally within one year from its commencement. This case belongs to the first group, and the man must be reckless and inconsiderate who should under such circumstances recommend the operation of gastrotomy.

Miss S., formerly of Bangor, has had ovarian disease for the past twenty-five years. She has suffered no inconvenience from the tumour, except from its bulk from which she obtains relief by tapping once in 4 or 6 years. She still lives, and enjoys a comfortable degree of health. An operation would be objectionable in this case, for the continuance of the disease in its mild and sluggish condition, is a less evil than the dangers attendant on gastrotomy.

The intermediate or *operative* group is represented by the following case: Miss Margaret George, of Orrington, aged twenty-two years, of delicate organization, active habits, and of very cheerful and hopeful disposition, informs me, that during the summer of 1855, she lost flesh, and was occasionally troubled with pain in the right side, occasioned, she supposed, by fatigue, as she was teaching school at the time, and had to walk over two miles each day. This indisposition lasted but a short time, and did not return for five or six months, when the pain or side-ache came on again, and she perceived a slight alteration in her form. In April, 1856, she discovered a circumscribed swelling on *the*

right side, with occasional darting pains through it. By advice of a physician she made use of a wash, which relieved her so much that she engaged to resume school teaching; but before the school commenced, she became worse, and the tumour increased in size to such a degree, that it was thought proper to have further medical advice. At this stage of the case I was consulted, and found the disease to be connected with the ovary, and from the fact that the right side was the seat of the first uneasiness, I supposed that the right ovary was the one diseased. The swelling at the time I first saw her, seemed to occupy the whole of the abdomen, and she did not complain of more distress or suffering than might have been produced from the bulk and pressure of the tumour. Miss G. at this time retained all her buoyancy of spirits and energy to such a degree that she was reluctant to lay aside her habits of active in and out-door exercise. This state of things continued, with the exception of a steady increase of size, until February, 1858, when the oppression became so distressing that tapping was resorted to, and 30 pounds of a dark and glutinous fluid was drawn off. In a few days she was able to resume her usual place in the family, and visited, as she formerly did, her friends in the neighbourhood, by riding or walking, as opportunity presented. But the effusion began rapidly to accumulate, and in July it was found necessary to use the trocar again, when about twenty pounds of a fluid, much thicker than what was drawn before, escaped. Four days after the tapping she left her room, and with the exception of a loss of flesh, and a slightly accelerated pulse, she appeared as well as she did after the former tapping. However, a few weeks' time convinced me that this palliative treatment would soon exhaust her, and as no objectionable condition to an operation could be detected, the chances of its success as well as its dangers were presented to her, and to her family, with the assurance that it was the only thing left to be attempted, different from the treatment already pursued. On the 28th October she was tapped again, and 34½ pounds of fluid were taken from her. She now wished to avail herself of the chances of ovariotomy, and the 18th of November was appointed for the operation, being one week following her expected menstruation. Directions were left for a gentle cathartic, of castor oil, to be taken on the 17th, and an injection of warm water to be given on the morning of the 18th, and no solid food to be allowed for twenty-four hours previous to the operation.

November 18th, at 2 o'clock P. M., after securing a temperature of 75°, and a humidity of the air of the room, by the vapour of boiling water, the patient was placed on the table, and brought under the anæsthetic influence of sulphuric ether. An incision was made through the walls of the abdomen, in the median line, of sufficient size to ascertain that the tumour was a *multicyst*, and that no inseparable adhesions existed. Attempts were made at this stage of the operation, to empty the cysts by the trocar, but in consequence of the thick and flaky character of the fluid, obstructing the canula, it was determined to enlarge the incision, and extract the tumour entire. The incision was increased to the extent of 11 inches, and it was then found that the adhesions to the tumour consisted of the omentum, peritoneum of the right side, and the under surface of the liver. The two first adhesions were about a hand's breadth in extent, the latter about an inch and a half square. These adhesions were so firm, that it was impossible to separate them without rupturing many vessels, and leaving attached to the peritoneal surface strips of the outer covering of the cysts. The adhesion to the concave surface of the liver, alone yielded without occasioning any laceration. In effecting a separation of the adhesions, many of the cysts were ruptured, which greatly complicated the operation. The pedicle was found to be on the left side, and of half the size of an adult wrist. It was secured by a double ligature of linen cord, and four ligatures of silk thread were found to be necessary to secure the omental vessels. The tumour was entirely removed, and the abdominal cavity carefully sponged, the edges of the incision kept in apposition by nine stitches, and the whole abdomen supported by a broad roller. The patient was then placed in bed, and she soon recovered from the effects of the ether, and expressed herself as feeling much more comfortable than she expected; at this time the pulse was 90, and of sufficient

volume not to require any diffusible stimulant. Forty drops of laudanum were given."

It is unnecessary to notice the progress of the case, which was favourable. The ligatures of the pedicle came away on the 34th day; all the omental ligatures except one came away earlier. The wound, at the date of the last report, had healed, the patient had recovered strength, and her catamenial functions were naturally performed.

"The tumour consisted of numerous cysts from the capacity of three or four quarts, to that of a few drops, interspersed with masses of gelatine, held together by areolar tissue. Many of the cysts were compound and endogenous, and even the third series of filial cysts might be traced from the parent sac. These cysts were formed of two layers—one external, fibrous, resembling very much a healthy *dura mater*, and an internal, of the appearance of the peritoneum slightly inflamed, its capillaries were highly injected, and were revealed most beautifully by the microscope. The coats of the cysts were held together by an intervening cellular tissue. The inferior cysts seemed to originate from the gelatinous masses which appeared to be deposited between the walls of the parent sac, and they generally were attached by broad bases to these heterologous bodies.

The whole of the tumour weighed as follows:—

Solids, &c., removed entire	26½ lbs.
Fluids secured	22½ "
" lost, (at least)	10 "
Weight of the whole	59 "

The contents of the cysts were of different consistences. Some were nearly limpid, others were as thick as molasses, and so tenacious that they could not pass through a large sized canula. Notwithstanding this difference of fluidity of the contents of the cysts, they all had the same specific gravity, 1013; but when some of the most limpid were exposed rapidly to a boiling temperature, and then cooled suddenly to their former standard of heat, so that little evaporation was produced, their specific gravity rose to 1035, showing that its levity depended in a great measure upon air or gas being held by its particles. Its chemical character was evidently that of gelatine, as it could be precipitated by tannin, even when largely diluted with water. No albumen could be detected in it, even by the most delicate tests. The microscope revealed nothing in this abnormal fluid except nucleated cells, resembling those of pus, only larger. No caudate or other abnormal cells could be discovered, but from the general *colloid* character of the *intracystoparietal deposits*, as well as from that of the fluids, we fear the case may not be free from malignancy, although the general good health and energetic character of the patient strongly negative such a conclusion."

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Treatment of Fracture of the Thigh.—Dr. G. F. Shrady, Resident Physician to the New York Hospital, gives (*New York Journ. of Med.*, March, 1859) the following account of the mode of treatment for fractures of the thigh, introduced some years since in the New York Hospital, and which is very similar to that practised in the Pennsylvania Hospital. The statistical results, it will be seen, show the method to be highly successful:—

"Previous to 1837, fractures of the thigh in this institution were treated for the most part over the double inclined plane, and but very rarely Boyer's apparatus was employed. The results under this mode of treatment, as might be expected, were very unsatisfactory.

"About the time I refer to, Dr. Gurdon Buck, who was on a visit to Philadelphia, saw Dr. Physick's apparatus, a modification of Desault's, for the treatment of these fractures, and was so well pleased with its general principle of application, that he determined to introduce it into this institution, as a decided improvement upon the old plan. This he did soon after his return to the city. He adopted Dr. Physick's apparatus in all its details, which consisted of a long outside splint, reaching from the axilla to eight or ten inches beyond the foot.

It was perforated at its upper end with two half-inch holes for the purpose of securing the ends of the counter-extending perineal strap, and the extending band, formed of a silk handkerchief, was passed over a block that stood out from the splint below the foot, being secured finally in a hole further down at the lower end of the splint. There was also a short splint reaching from the perineum as far as the inner ankle, and a body-belt, passing around the thorax, tacked to the upper end of the long splint. In addition to all this, chaff pads were interposed between the splints and the limb. In applying the splints, they were first rolled up in a splint-cloth, and well secured in place by four separate bands passing around the whole apparatus.

"After making use of the apparatus for some time, it was found to be defective in many particulars; for instance, the readjustment of the splint-cloth was found to be very troublesome, as it had to be repeated daily. The first improvement, then, of Dr. Buck was the substitution for these cloths of pads, which were fastened to the splint. The next improvement made by the doctor, was a pocket in the body-belt, and to the lower edge of this pocket were fastened buckles for the counter-extending strap. By this arrangement the splint could be removed for the purpose of readjustment without disturbing in any way either the belt or strap.

"Notwithstanding the utmost care and pains bestowed on the adjustment of the extending band to the foot, it was found impossible to prevent sloughing and excoriation either above the heel, or over the instep. Owing to the evil consequences of such extension, it was finally supplied by well adapted lateral pressure, the limb having been previously extended. This being the case, it was necessary to reapply the pressure daily. This method was persevered in for some time, but was at length abandoned for the use of the adhesive plaster as a means of extension. It was first employed in 1850, during the residence of Dr. Frederick D. Lente, now of Cold Springs, Putnam County. This gentleman, by his zeal and intelligence in its application, successfully inaugurated its use in this institution as a valuable auxiliary in the treatment of this fracture. Buck's modification of Physick's Desault, is certainly a triumph in modern surgery, so far as it relates to shortening and deformity. I have now noticed the principal modifications of Physick's splint; there are, however, several minor ones, which will appear in the subjoined description of its mode of application.

"When a patient is admitted with a fracture of the thigh, there being generally a good deal of swelling present, the limb is placed upon the double inclined plane until all the tumefaction has subsided. Then he is prepared for the application of the straight apparatus. The first step consists in the preparation of a double band of adhesive plaster about three inches in breadth, which is cut long enough to extend from below the point of fracture on either side of the limb, forming a loop underneath the foot, a sufficient distance from the sole to allow of the introduction of square block. This block is a little broader than the foot, and serves to prevent the pressure of the adhesive bands over the ankles, and also affords a firm point to which is attached a short cord for extension. This adhesive strap is applied smoothly to the sides of the limb and a bandage applied over it, leaving the loop free, extension being kept up in the meantime by an assistant. The body-belt and perineal strap are next adjusted, after which the coaptation splints are applied in the usual way around the seat of fracture. Then the upper end of the long splint is placed in the pocket of the body-belt, the limb drawn down as far as possible, and kept fully extended by means of a stout cord over the footpiece. This cord is attached to a ring in a large wooden screw which plays through the block standing out from the internal surface of the splint. Next the inside splint, extending from the groin to the malleolus is applied, pads of blanket are then stuffed on either side to adapt the splint to the inequalities of the limb. All this having been done, the last step in the operation consists in binding the splints together, which is accomplished in the following manner. Three strips of bandage are passed at equal distances from each other behind the limb; one just below the trochanter, another just below the knee, and a third above the ankle.

"The ends of these strips are then brought forward between the limb and the splints, carried over the anterior edges backward over the outside of the appa-

ratus, crossed behind, and finally brought forward around the whole again and tied in front. By this arrangement a sling apparatus is made for the whole limb, at the same time the splints are nicely secured to each other. The extending force is regulated by means of the screw through the block. This block, I should say, slides in a fenestrum, being secured at any part by a screw arrangement, by which means the proper distance between it and the foot can be regulated in order to have the full advantage of extension.

"This, then, constitutes Buck's modification, in other words, the New York Hospital splint, which since its first introduction into practice has never yet betrayed the confidence that has been placed in it. Perhaps the greatest addition toward perfection that it has had was the employment of the adhesive plaster; since that time, the results may be judged of from the following statement of 74 cases which involved the shaft of the femur exclusive of either extremity. These cases are taken in the order of their occurrence from the hospital records.

"Seventy-four cases have been collected.

"Of this number, 19 resulted without any shortening, the shortening in the remaining 55 averaging less than ¾ of an inch. The ages ranged from 3 to 64 years. 57 were over 12, and 17 under that age. Of the 57, there was no shortening in 13 cases, but in the remaining 44 the shortening was a fraction over ¾ of an inch. Of the 17 under 12 years, 6 resulted without shortening; the remaining 11 averaging less than ½ of an inch shortening."

Suggestions of Improvements in Tracheotomy.—Prof. D. BRAINARD offers (*Chicago Med. Journ.*, March, 1859) the following suggestions for preventing hemorrhage, and for keeping the opening made in the operation pervious without resorting to a tube:—

1. *Hemorrhage.*—In order to prevent this, Dr. B. proceeds in the following manner: "Having incised the skin and facia by successive and careful incisions, I press the sterno-hyoid and sterno-thyroid muscles to each side with the fingers, and thus expose the thyroid body. This effected, I pass under the isthmus a director curved, or an aneurismal needle. This was followed by a common suture needle, which may be passed with the blunt end foremost, armed with two very strong ligatures. A ligature is then tied very firmly on each side, and the isthmus of the thyroid body divided between them. A little dissection with a blunt instrument denudes the trachea to the required extent, and an opening can be made without danger of a drop of blood being drawn into it.

"The ligatures which have been thus secured, serve the purpose of fixing the trachea, if desirable, and they may be tied behind the neck so as to raise it forward, and keep the wound open. I never open the trachea until the hemorrhage is stopped, and a large surface of it has been quite denuded.

"2. *Keeping the opening in the trachea pervious without resorting to a tube.* The objections to a tube are twofold: 1st. When the operation is performed for the extraction of a foreign body, it prevents its exit; and it is desirable to leave this opening in such a state that the foreign substance may escape whenever it becomes loosened from its situation in the bronchia. 2d. In tracheotomy for croup, the prolonged sojourn of the tube has been considered, by the most eminent surgeons, as a cause of the pneumonias which so frequently are the cause of death.

"The necessity for using the tube I avoid by the following means: Having denuded the trachea, insert a small suture needle, armed with a ligature, beneath two of its rings. Withdraw the needle, and, drawing gently upon the thread, make a semi-circular incision on one side, so as to form a valve, readily opened by drawing upon the thread. The opening thus formed can be kept patent or be allowed to close at will.

"This is a matter, perhaps, of much greater consequence than might be supposed without reflection. Most surgeons have found their operations for tracheotomy less successful than they had reason *a priori* to expect, and this has been attributed to the direct entrance of cold air into the lungs. Trousseau and Guersent have both advised that the air inhaled at that time should be quite warm without being too hot."

Clinical study of the Heart-Sounds in Health and Disease.—The following is the summary of the conclusions arrived at by Dr. AUSTIN FLINT, from a study of the Heart-sounds in health:—

"1. The *first* sound of the heart is a mixed sound, when studied at the situation where its intensity is greatest, viz., over the apex of the organ. Comparing its characters in this situation, when the person examined is placed in different situations; when the stethoscope is placed directly on the surface, and when a soft material is placed beneath the instrument, or when it is very lightly and imperfectly applied; contrasting its characters over the apex with those in situations more or less removed from the borders of the heart, and taking into consideration modifications incident to certain diseases, and peculiar to certain persons in health, this sound is shown to be composed of two elements, one due to valvular action, and the other to the impulsion of the apex against the thoracic parietes. The first of these elements may be called the *valvular element*, and the second the *element of impulsion*.

" 2. The *first* sound is almost invariably accentuated at the apex. The element of impulsion is here almost constantly predominant. The element of impulsion is also predominant, as a rule, over the body of the heart; but occasionally the valvular element becomes more or less marked, when the stethoscope is carried above the apex. At the base of the heart the valvular element is much oftener predominant than over the body of the organ. At the left border, over the nipple on the left side, the valvular element generally predominates, and on carrying the stethoscope to the left of this point, for a greater or less distance, the element of impulsion is eliminated, and the valvular element remains, leaving the sound as purely valvular in quality, and as short, as the second sound. The valvular element predominates generally at the right border of the heart, and at all the points removed from the præcordial region, where the first sound is appreciable. Although, therefore, the element of impulsion is usually predominant over the apex and body of the heart, the valvular element is alone diffused much beyond the limits of the organ.

"3. The valvular element of the first sound is less intense than the second sound, the latter being often heard in situations to which the former is not transmitted—viz., on the lateral surfaces of the chest, in the infra-clavicular region on the right side, and over the back.

"4. Over the inferior border of the heart, near the xiphoid cartilage, the valvular element of the *first* sound frequently differs in pitch from the same element of this sound when studied at, or without, the left nipple. This may be considered as showing that in the latter situation the sound emanates from the mitral, and in the former situation from the tricuspid, valves. When a disparity in pitch is presented by the first sound in the situation just named, the pitch is lower at the inferior border of the heart. When the sound in this situation is compared with that over the apex, and a difference is observed in pitch, the pitch is lower over the apex.

"5. The intensity of the *first* sound not only varies widely in different persons, but is subject to considerable variations in the same person within the limits of health, as well as in connection with disease. These variations in intensity affect especially the element of impulsion. The valvular element undergoes comparatively little change, in this respect resembling the *second* sound of the heart.

"6. The interval between the first and second sounds varies in different persons, according as the element of impulsion in the *first* sound is more or less marked. The prolongation of the first sound is due to this element. When, from any cause, this element is impaired or eliminated, the interval between the first and second sounds is lengthened. In those situations on the chest in which the valvular element is heard without the element of impulsion, this interval is distinctly longer than when the two elements are combined as they usually are over the apex.

"7. The *second* sound has an unmixed valvular quality, and is best studied over the base of the organ, where its relative intensity, in most persons, exceeds that of the first sound. The points where its characters are generally best

marked, are the intercostal spaces between the second and third ribs on the two sides, near the sternum.

"8. On comparison of the *second* sound on the two sides at the points just named, a difference in pitch and other characters is generally apparent. This fact, taken in connection with the anatomical relations of the aorta and pulmonary artery at these points, and also with clinical facts pertaining to disease, leads to the conclusion that when such a disparity exists, the characters of the sound on the left side are due to the action of the valves of the pulmonary artery, and the characters of the sound on the right side, proceed from the aortic valves.

"9. The *second* sound presents the characters of that produced at the orifice of the pulmonary artery, in a small proportion of instances in the third intercostal space on the left side, and over the body of the heart in the superficial cardiac region. In a larger proportion of instances it presents these characters over the inferior border of the heart. Elsewhere, within the præcordia, and at points removed from the præcordial region, wherever the *second* sound is heard, it presents the characters distinctive of the sound produced at the aortic orifice.

"10. The *second* sound is not subject to great variation, even as regards its intensity, in the same person, and it maintains its distinctive characters unaffected by the causes which affect the movements of the heart within the limits of health, such as exercise, mental agitation, &c. It remains unchanged under circumstances which alter considerably the characters of the *first* sound.

"11. Although generally the relative intensity of the *second* sound, is notably greater over the base than over the apex of the heart, the absolute intensity of this sound is often not less, and sometimes even greater over the apex, than over the base. It may even be accentuated in the latter situation in health.

"12. It follows from facts contained in this summary, that the *second* sound produced at the aortic orifice has a degree of intensity much greater than that at the pulmonary orifice; and it also follows from facts contained in this summary, that the intensity of the valvular element of the *first* sound is due to the mitral, much more than to the tricuspid valves."

The following is the summary of conclusions relating to the heart-sounds in disease.

"1. The two elements which compose the *first* sound of the heart, viz., the valvular element and the element of impulsion, may be affected conjointly but unequally; or one element may be affected exclusive of the other, and either may be extinguished while the other remains.

"2. Of the two sounds which unite to form the valvular element, viz., the mitral and the tricuspid, the former may be abnormally diminished in intensity, or extinguished, while the latter continues, and its intensity is in some instances greater than in health. When this is the case, injury or destruction of the mitral valves is indicated. An abnormal intensity of the tricuspid sound, under these circumstances, denotes hypertrophy of the right ventricle, and there will probably be found, at the same time, exaggeration of the pulmonary *second* sound of the heart.

"3. To determine whether weakness or extinction of the mitral valvular sound be due to injury or destruction of the mitral valves, or to diminished muscular power of the heart's action, this sound is to be compared with the element of impulsion. If the latter element, over the apex of the heart, be well marked, while the valvular element without the left nipple, be feeble or wanting, it is to be inferred that the mitral valves are more or less seriously damaged. This inference, however, is not to be drawn if it be suspected that the mitral sound is not appreciable or imperfectly heard, in consequence of the intensity, roughness, or diffusion of a co-existing murmur.

"4. On the normal intensity of the mitral valvular sound, when a murmur is present, referable to the mitral orifice, may be predicated the opinion that the abnormal changes giving rise to the murmur, have not, as yet, compromised seriously the integrity or function of the mitral valves.

"5. When morbid conditions exist, organic or inorganic, which intensify the *first* sound of the heart, in hypertrophy and functional disorder, the intensity of both elements of this sound is increased, but the element of impulsion is exag-

gerated disproportionately to the valvular element. So, also, when the muscular power of the heart is weakened by any cause, the auricular valves remaining unaffected, the element of impulsion is enfeebled more than the valvular element, and the latter is sometimes lost when the former is still appreciable. Both elements, however, may be extinguished by causes which weaken the muscular power of the heart, while the *second* sound continues to be heard in different situations.

"6. If, from any cause, the *first* sound be weakened so as to extinguish the element of impulsion but not the valvular element, this sound, in duration and quality, resembles the second sound. When this is observed over the apex of the heart, where the element of impulsion is most marked in health, it does not follow that the heart is dilated. Weakness of the systolic movement is alone indicated, and this change in the duration and quality of the *first* sound, at the point stated, occurs in cases of great hypertrophy as well as dilatation, if the muscular power of the organ be sufficiently impaired. The same change may occur when the muscular power of the heart is impaired by fatty substitution, softening, and by dynamic causes.

"7. Abnormal intensity of the element of *impulsion* occurs when the muscular action of the heart is increased from any cause. Mere abnormal intensity may not indicate more than the increased action due to functional excitement, but if the *first* sound be notably prolonged and dull (characters which depend on the element of impulsion), hypertrophy is indicated. The absence of these characters, however, is not evidence against the existence of hypertrophy, since the muscular power of the organ may be diminished to an extent to weaken and even extinguish the element of impulsion, when the organ is greatly hypertrophied.

"8. The *second* sound of the heart being constituted by a valvular element alone, is not subject to modifications which are practically important, except as regards its intensity and the degree of valvular quality. It may be exaggerated, weakened, or extinguished, and the valvular quality more or less marked.

"9. The *second* sound emanating not from one source, but consisting of an aortic and pulmonary sound, which are distinguishable from each other in certain situations in health, the abnormal modifications may relate to either, exclusive of the other. The aortic and pulmonary sounds may be separately increased or diminished in intensity, and each may be extinguished, the other remaining.

"10. Extinction of the aortic sound, the pulmonary sound not being suppressed, denotes destruction, or very serious injury of the aortic valves. This conclusion is corroborated by the presence of a murmur referable to the aortic orifice.

"11. Abnormal weakness of the aortic sound denotes injury to the aortic valves, especially if an aortic murmur be present, provided that this weakness be not attributable to mitral contraction or regurgitation, or to impaired muscular power of the heart. The presence or absence of mitral disease may generally be determined by the presence or absence of a murmur referable to the mitral orifice, and to determine whether the weakened aortic sound be due to impaired muscular power of the heart, this sound may be compared with the pulmonary sound, which, in health, is feebler than the aortic. Evidence of enfeebled action of the heart is also obtained by observing the *first* sound. The second sound of the heart, however, is comparatively much less affected by the various conditions which involve impairment of the muscular power of the organ, than the *first* sound.

"12. On the normal intensity of the aortic sound may be predicated an opinion that the aortic valves are sound. When this sound is found to retain its normal intensity, in connection with a diastolic murmur, the fact renders it probable that the murmur is produced by the direct current of blood through the mitral orifice, and not by aortic regurgitation. When the normal intensity of this sound continues, in connection with a systolic murmur referable to the aortic orifice, it shows that, although a lesion exists in this situation, it has not, as yet, led to serious change of the valves.

"13. Exaggerated intensity of the aortic sound occurs in cases of hypertrophy affecting the left ventricle so long as the muscular power of the organ is not

impaired. This alone, however, is not a sign of hypertrophy, for the sound is also exaggerated when, from any cause, the power of the heart is increased.

"14. Abnormal modifications of the pulmonary sound relate, so far as their importance practically is concerned, to an increased intensity of this sound. When it is found to be relatively more intense than the aortic sound, it denotes either that it is positively exaggerated, or that the aortic sound is abnormally weakened, or both these conditions may exist. If the aortic sound be not abnormally weakened, greater relative intensity of the pulmonary sound is evidence of hypertrophy of the right ventricle. In connection with this exaggeration, the tricuspid portion of the valvular element of the first sound will be likely to be intensified. Whether a greater relative intensity of the pulmonary sound be due to a positive exaggeration, or to diminished intensity of the aortic sound, or to both combined, it is generally observed in cases of mitral disease attended by either obstruction or regurgitation. This rule, however, is not without exceptions."

—

Hypophosphite of Quinia.—Dr. J. Lawrence Smith calls attention (*Semi-Monthly Med. News*, May 1, 1859) to a new salt of quinia—the hypophosphite. This he states "was first made by adding an excess of recently precipitated quinine to a hot solution of hypophosphorous acid, and on cooling, the salt crystallizes out in beautiful silky tufts, which, when dry and broken up, resemble asbestos in appearance. The method adopted and proposed for making it on a large scale, is by double decomposition; using the sulphate of quinine and the hypophosphite of baryta, the operation must be conducted so that there shall be no excess of either salt in the solution; the solution is filtered from the sulphate of baryta, concentrated and allowed to crystallize, which it does in the manner already mentioned.

"The salt thus obtained is in delicate fibrous crystals, soft to the touch; they are of a beautifully silky lustre, very soluble in hot water; one ounce of cold water at 60° Fahr. dissolves 8 grains of the salt. When heated, it loses its water at about 230°, and at about 300° it turns brown and melts."

He suggests the use of this preparation in the hectic fever of phthisis, and wherever quinine is useful. Dr. S. has been led to make this combination from the efficacy claimed by Dr. Churchill for the hypophosphite in phthisis.

—

Acids existing in the Juices of Rhubarb Stalks, Tomatoes, and Quinces.—Mr. T. A. Lancaster has published (*American Jour. of Pharm.*, May, 1859) his investigations on this subject, from which it appears that one pound of rhubarb (*Rheum rhaponticum*) stems yielded thirteen ounces of juice, which produced seventy grains of crystallized bin-oxalate of potassa.

One pound of quinces (*Cydonia vulgaris*) yielded twenty-five grains of crystallized bimalate of lead.

One pound of tomatoes (*Solanum lycopersicum*) yielded eleven ounces of juice, which produced ten grains of crystallized acid malate of lime, besides an unascertained amount of acid citrate of potassa.

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